

## Jean-Claude Trichet: Achieving maximum long-term growth

Speech by Mr Jean-Claude Trichet, President of the European Central Bank, at the Federal Reserve Bank of Kansas City Economic Symposium, Panel: Setting priorities for long-term growth, Jackson Hole, 27 August 2011.

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The title of our panel today is *Setting Priorities for Long-Term Growth*. Given all of our recent struggles to regain our reference growth paths, it may strike some as something of a luxury to think about the long run; central bankers and policy makers have had to devote unprecedented attention to higher-frequency economic developments. Many new lessons have been learned; many policy and institutional innovations have been introduced.

The recent financial crisis has produced a large and persistent downturn in our economies; a downturn, moreover, that threatens our long-run growth potential. It is therefore entirely natural that policy makers do not lose sight of the prerequisites for stable sustainable growth.

This is especially so for most of the advanced economies, including the euro area, characterized (as it has been in recent decades) by declining potential growth rates. In the face of any economic predicament, one should ask oneself two questions – what got us here, and what can get us out? In the wider case of sustainable growth for the euro area, what matters is a commitment to structural reforms and sound macroeconomic policies. In the case of the financial matters, a robust macro prudential and supervisory framework is key. I will address both these issues in my coming remarks.

Likewise, some may consider it unusual to solicit views on matters of long-run growth from the President of a central bank. After all, pick up just about any growth-theory textbook and you'll find few references to inflation and fewer still to monetary policy. Monetary policy is fundamentally viewed as neutral over the long run.

And indeed, inflation *is* ultimately a monetary phenomenon. Growth, in turn, *is* ultimately a real one reflecting, in particular, technology, education and training, capital accumulation, institutional quality.

Nonetheless, monetary-policy institutions can play and have played a fundamental role in supporting long-run, sustainable growth. In many ways, I see a parallel between the theory and practise of monetary-policy making and the shaping of modern growth analysis which emphasises the role of sound/proper institutions.

That achieving high and sustainable growth matters, however, is easy to motivate. On the subject of growth differences across countries, Lucas (1988) memorably wrote: *The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else.*

### I. What drives growth in the long run?

So let's start to think: what *does* drive growth in the long run? In fact, growth theory – much like central banking – has come a long way. As everyone knows, Solow's work in the late '50s produced two startling insights.<sup>1</sup> First, that smooth factor substitutability could rid us of the Harrod-Domar boom-bust cycle. This, in fact, paved the way for a proper analysis of

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<sup>1</sup> Solow (1956, 1957).

sustainable growth.<sup>2</sup> His second insight was that growth was driven not only by factor accumulation but also by technological progress.

Fundamentally, technological progress and innovation are, over the long run, the prime drivers of economic growth and also important reasons for differences in international economic performance, even though demographic differences are also very relevant. Higher growth rates of technical innovation raise output and can lower the non-inflationary rate of unemployment.

But what is technical change? Cracking open the Solovian black box of technical progress has taken us from theories of learning-by-doing, to the impact of R&D on product variety and quality. The latter theories being underpinned by Paul Romer's reflection on the fact that ideas are fundamentally non rival.<sup>3</sup> This concept, by the way, was not really new. The famous letter of Thomas Jefferson to Isaac McPherson expressed it very clearly in 1813.<sup>4</sup> The bottom line in all of this is that knowledge spillover between open, dynamic economies could benefit everyone. Not surprisingly, these new developments in growth theory came replete with policy prescriptions.

A more recent but allied literature suggested the following: how close an economy is to the technological frontier and whether its institutions facilitate convergence to that frontier are vital considerations.<sup>5</sup> In effect, a laggard country gains by implementing (or jumping to) frontier technologies.<sup>6</sup> But an economy *near* the frontier – or with an appetite to define that frontier – should increasingly favour innovation over imitation.

Like many close to European policy<sup>7</sup>, I find this an attractive framework. Indeed, following World War II, the European economies were remarkably catching up in productivity and technological terms and today are leaders in many fields, in particular as concerns the embedding of technological innovation in manufacturing processes.<sup>8</sup> Yet, there is still an enormous potential to tap, to reform our economies and boost their growth potential and job creation.<sup>9</sup>

## II. Growth patterns in the euro area and us

Debates about the US versus the euro area have become common place in recent years. To my mind, though, such debates often fall short of a careful, nuanced analysis required. Some international comparisons *are* indeed informative and yield important insights. Others – given lack of harmonized data, data concept or data unit – are more suspect. The crisis, though, has taught us that growth is only meaningful if it is sustainable and balanced. Growth that is not sustainable but follows boom-bust cycles, carries enormous costs in terms of economic well-being. These costs go far beyond pure GDP numbers; the deepest of these costs is that they, in some cases, put a strain on the fabric of our societies. For that reason alone,

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<sup>2</sup> For contemporary discussions see La Grandville (2009), Klump et al. (2007 a, b).

<sup>3</sup> Romer (1990).

<sup>4</sup> "... He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature ...", *Letter of Thomas Jefferson to Isaac McPherson*, 13th August 1813.

<sup>5</sup> Acemoglu, Aghion and Zilibotti (2006).

<sup>6</sup> This is the so-called advantage of backwardness, Gerschenkron (1962).

<sup>7</sup> Sapir et al. (2003), Kok (2004).

<sup>8</sup> Gomez-Salvador et al. (2006).

<sup>9</sup> See for example, the discussion in Sondermann (2011).

sustainability is a key qualification to associate to growth. The second key term is the balance of growth, both in domestic and external terms. Domestically balanced growth implies a broadly acceptable distribution of economic well-being within societies in terms of income and wealth as well as the avoidance of misalignments especially of asset prices; and externally balanced implies the need to avoid excessive international disequilibria.

Since the introduction of the single currency in 1999, the euro area has experienced a per-capita growth rate that, at around 1% a year, is comparable to that in the United States (1.1%). This is the first fact that is often overlooked in international comparisons. In such comparisons, we often look at headline growth numbers; yet, demographics are very different. Adjusted for population growth, there has been virtually no difference between US and euro area growth over the first decade since the introduction of the single currency. The euro area, though, has created more jobs: 14 million compared with 8 million in the US. Further, over recent decades differences in country and state dispersion rates of growth and inflation in the euro area and US are remarkably similar. On employment, moreover, it will be interesting to compare our different evolutions in the coming years. What we all want to avoid is excessively volatile employment where human capital is all too easily lost and inequality deepens.

**Table 1** shows a detailed comparison of the euro area with the US over recent decades. This makes the standard growth accounting of contributions into employment and labour productivity. Labour productivity itself can be further decomposed into changes in labour composition, Information and Communication technologies (ICT) and non-ICT usage per hour and (residual) TFP growth. The interest in the distinction between ICT and non-ICT reflects recent evidence that the ICT sector has been strongest where most growth has emerged across the world economy.

Looking over the contributions, we note a significant difference in labour productivity (1.7 for EU13 vs. 2.9 for US). The main drivers in this comparison of labour productivity are ICT capital services per hour (0.4 vs. 1.0) and, perhaps more significantly from our standpoint, economy-wide TFP (0.5 vs. 1.1). Although having said that, there turns out to be quite some heterogeneity among countries.

Moreover, *see Table 2* analysing the sectoral decomposition of TFP growth. TFP in the production of goods is slightly larger in the euro area than in the US. Rather, the higher overall TFP growth in the US is driven by stronger TFP growth in services, in particular in distributive trade (0.2 vs 0.5).<sup>10</sup> Although, in passing, we should remember that productivity and technical improvements in Services are plagued by measurement difficulties.

But of course TFP numbers always represent a rough metric.<sup>11</sup> The TFP residual will be contaminated by measurement errors, erroneous assumptions about market structure, or the nature and existence of the aggregative production function. The residual will also be a catch-all of neglected factor utilization, factor quality improvements over time, statistical complications associated in calculating factor rewards (appropriate tax and depreciation allowance for capital income etc).

But the wider perspective is: (1) the services and distributive sector is now a dominant and growing part of the euro area economy's output (around 60%) and employment share; (2) the Service sector typically more regulated and thus less flexible to changes and open to innovation<sup>12</sup> although certainly recently there has been progress in the deregulation of

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<sup>10</sup> Note, the share of respective sector grouping's value-added in total value-added across both countries are quite similar: Goods Production (0.44 for the euro area; 0.36 for the US), Market Services (0.35 for the euro area; 0.42 for the US), and Distributive Trades (0.21 for the euro area; 0.22 for the US).

<sup>11</sup> See for example the discussion in Crafts (2008).

<sup>12</sup> See European Central Bank (2006).

network industries and progress through the new Services directive; (3) evidence is mixed but the Service sector in general is often thought to have inherently lower productivity and employment generation mechanisms relative to the more open manufacturing sector.

### III. Diversity within the United States and the euro area

Allow me, next, to take a closer look at the developments both across US states and euro area Member States.

For the euro area it is very common to look at the level of its constituent countries and focus on the diversity among individual states, because a number of economic policy choices that affect productivity are national.

For the US, this exercise is rarely done. It is often conjectured that relevant policies are federal, and therefore by definition uniform at the level of the federation; and that, as a consequence, differences at the state level play much less a role. In essence, it is therefore often assumed that the US economy would be significantly more homogeneous than the economy of the euro area.

Looking more closely at the regional dispersion across US regions and euro area economies does not confirm this. In fact, the dispersion of many of the key indicators is surprisingly similar.

Let me share with you some findings from our analysis that we started some months ago and begin with inflation.<sup>13</sup> Before the crisis, the dispersion of HICP inflation in euro area countries had remained broadly stable since the late 1990s, at a level similar to the 14 US Metropolitan Statistical Areas.<sup>14</sup> During the crisis we saw a temporary increase in inflation dispersion in the euro area but this has been reversed over the past 12 months. **(Chart 1.)**

The picture is similar for the dispersion of GDP growth. Before the crisis the dispersion of growth rates was around 2%, in both the euro area and the United States. Dispersion rose somewhat during the crisis in both currency areas but remained broadly in line with pre-crisis patterns overall.<sup>15</sup> **(Chart 2.)**

Going one step further, investigation of the sources of this growth dispersion in the US and euro area economies reveals parallels even in the root causes of dispersion in economic performance and productivity. On the one hand, both currency areas comprise regions that experienced a significant boom and bust cycle over the past decade. On the other hand, both also contain regions that are facing significant structural challenges of a more long-term nature.

In the United States, for example, Nevada, Arizona, Florida and California experienced increases in house prices that outpaced the national average by a wide margin. The steep house price increases accompanied above average growth in these states. This could probably be explained, at least in part, by the impulse that these states received from the housing-related sectors such as construction, which saw its share in terms of value added increase at the national level during the years of the housing boom. In the crisis, the sharp

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<sup>13</sup> Keynote address by Jean-Claude Trichet, President of the ECB at the "ECB and its Watchers XIII" conference, Frankfurt am Main, 10 June 2011.

<sup>14</sup> The use of all US states in the computation of GDP dispersion, in contrast to only 14 US Metropolitan Statistical Areas (MSAs) in the computation of inflation dispersion, is to be explained by data availability. The most recent entries to the euro area have been excluded to avoid breaks in the time series.

<sup>15</sup> The 2010 data for US regions are estimates published by the Bureau of Economic Analysis on 7 June 2011.

fall in house prices in Florida and the south-western US states turned boom into bust. These states experienced the harshest recession among the US states.<sup>16</sup>

Similarly, in the euro area some countries experienced asymmetric boom-and-bust cycles. Several euro area countries had higher than average growth in the pre-crisis years. In Ireland and Spain particularly, strong growth was accompanied by strong increases in housing prices.

At the same time, other US states, particularly the former manufacturing powerhouses in the “Great Lakes” region, have seen a long episode of below average growth. Below average performance of the region – and particularly weaker growth rates in the states of Michigan and Ohio – are related to strong reliance on manufacturing. Structural shifts in the US economy towards services have gradually reduced the value added of manufacturing relative to GDP, with implications for areas with a high concentration of companies in manufacturing industries other than information and communications technology. During the crisis, GDP growth in the “Great Lakes” region, which was below average before the crisis, remained below average.

Similarly, other countries in Europe – Portugal, for example – have experienced growth persistently below the euro area average for the past decade due to structural rigidities that are now being addressed.

Just a few years ago, the low-growth group of countries included Germany – labelled the “sick man of Europe” at that time. Yet Germany is now an example of how big the dividends of reform can be if structural adjustment is made a strategic priority and implemented with sufficient patience.

The effect of the crisis on the different euro area economies follows a similar pattern to those of comparable US states. The countries in the euro area that have been hit hardest are those in which either large asset-bubble driven imbalances unwound or structural problems were left unaddressed before the crisis. Those countries that have yet to implement more far reaching structural reforms also have relatively low growth prospects after the crisis. These relatively low growth rates are linked to a deterioration of competitiveness, driven, for example, by persistent above average unit labour costs.

Precisely as regards the evolution of unit labour costs, that are so important for growth, dispersion both ahead of the crisis and during the crisis was quite similar in the euro area and the United States. **(Chart 3.)**

At the same time, it is worth noting that both currency areas include regions with persistently above or below average unit labour cost growth. Again leaving aside the countries to join the euro area most recently, here, Greece, Portugal and Ireland, in particular, had progressively lost competitiveness vis-à-vis their main trading partners in the euro area. They are now engaging in catching-up, adjustment strategies. Germany, which had lost competitiveness in the reunification process, by contrast, has been able to restore this competitiveness over the same period of time. **(Chart 4.)**

Similar persistent losses and gains in unit labour costs are also observed in the United States. Taking a look at the upper and lower bound of the spectrum of US states over the same period as the euro area reveals that some states have experienced large or persistent increases in unit labour costs, currently exceeding the national average by as much as 20%. Other states have been improving their labour cost competitiveness vis-à-vis the national average over the past decade. **(Charts 5, 6 and 7.)** In summary, there are strong indications

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<sup>16</sup> The “Industry specialization index” – a measure of the degree to which states are more or less specialized in an industry relative to the nation average – reveals that California, Florida, Arizona and Nevada all witnessed the share of their respective construction sectors increase relative to the national average between 2001 and 2006, followed by the opposite development after 2006.

that economic diversity in the euro area and the United States has not been significantly very different over the past 12 years.

The observation that very large, continental economies of the size of the US or of Europe are probably necessarily diverse should not be reason for complacency. The fact that advanced economies of the size of more than 300 million people have a tendency to be significantly diverse calls for a solid economic governance framework and explains why the ECB Governing Council has been so vocal in this ground since the inception of the euro area.

And this inherent diversity of advanced economies of large size is an additional reason to resolutely engage in the structural reforms that would permit to accelerate the completion of the European single market in all sectors, and to enhance the growth potential of each individual European economy and of the euro area as a whole.

#### IV. Setting priorities for long-run growth

Let us get back to our central theme – *Setting Priorities for Long-Run Growth*. Let me make some suggestions – three to be precise. A first, and overwhelming, priority – notably for the euro area – is the vigorous implementation of **structural reforms**. A second, but by no means unrelated priority, is the continued attention to *external and internal imbalances*. A final priority is greater **flexibility** on the part of policy institutions. Let's take them one by one, with a particular emphasis on the euro area.

First, **structural reforms**. We earlier noted the primacy of *institutions* in modern growth theory. Sound institutions are essential to encourage a flexible, cutting-edge, knowledge-based economy. There is substantial evidence from industry-level studies on regulation as well from firm-level studies on the dynamics of firm performance that confirm the need for such a conducive environment to generate productivity growth.<sup>17</sup>

Douglas North defined institutions as ... *the rules of the game in a society ... the humanly devised constraints that shape human interaction*.<sup>18</sup> And being "humanly devised constraints" (rather than exogenous geographical or climactic constraints), their major impact was through the setting of incentives.<sup>19</sup>

And one can see the remaining challenges for many advanced economies as follows:

- Employment regulation needs to help more proactively outsiders, low-skilled, young and older workers.
- In Europe, the single market needs to be advanced especially in the area of services.<sup>20</sup>
- Tax, benefit and pensions systems should not discourage labour participation and create weak incentives for investment and innovation.
- The distribution of wealth and general economic well-being needs to ensure some acceptable social balance.

Several remedial policy proposals have been suggested and implemented in the recent past. The most well known is the European Council's Lisbon Strategy for Growth and Jobs,

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<sup>17</sup> Nicoletti and Scarpetta (2003), Bartelsman et al. (2005).

<sup>18</sup> North (1990).

<sup>19</sup> North (1981).

<sup>20</sup> For instance, the Service sector accounts for over 70% of GDP but only 20% of intra-EU trade. Some home bias in the provision of Services is inevitable, but such a gap suggests that there are considerable local rents being extracted at consumers' expense.

followed by the Europe 2020 Strategy.<sup>21</sup> The latter is the Agenda that the European Union and its Member States have decided to help Europe recover from the crisis and come out stronger, both internally and at the international level.<sup>22</sup> The Agenda sets targets for the European Union in 2020 in terms of employment, research and development, energy and education.

The Agenda puts particular emphasis on structural reforms in the labour and services markets. These two markets are still over-regulated and not directly subject, given their largely non-tradable dimension, to the competitive forces originating from within and outside the single markets.<sup>23</sup> At the EU-level, the necessity and shape of structural reforms is acknowledged, but the gap between awareness and implementation is far from closed.

That said, we would do well to understand why political systems abide distortionary, inefficient structures and resist more efficient alternatives. Do structural reforms imply a J-curve of long-run gain but short run pain that sits ill with the decision making process in our democracies? Do vested interests strategically and systematically block change?

A second priority is **vigilance against imbalances**. I spoke at the last Jackson Hole symposium of the risks of chronic global *imbalances* and costs involved in unravelling the excessive private leverage, unsustainable fiscal and trade positions. Establishing more reasonable borrowing, restructuring and strengthening the balance sheets of firms, households and governments in an orderly manner remain key to smooth and continuous global growth. In all this, central banks are not immune. Tensions in financial markets and severe global imbalances deepen uncertainty and, therefore, profoundly challenge monetary-policy setting.

Precisely these dangers underpin the Mutual Assessment Process of the G20 framework. The indicative indicators – agreed in February this year – identify imbalances in public, private and external positions as the key culprits preventing balanced global growth, and a key input in shaping corrective policies. Seen in that light, a country's economic success should be judged also on these indicators and not only on its last few years' growth figures.

However, another imbalance – which has gained currency following the financial turbulence – is *income imbalances*. Naturally, extremes of income inequality and restricted opportunity challenge our values and strain the fabric of our societies.

In short, growth skewed towards the few (or absent for a large minority) risks social tensions, undermines institutions and encourages policy failures of one kind or another. Structural reforms, particularly in the form of re-training, improving job matching, providing flexibility and incentive for job creation and innovation remain the best policy options for encouraging well-balanced growth, and an environment of low and credible inflation the best environment to encourage matters from a central-banking perspective.

Finally, a priority for medium and long-run growth is that **our policy institutions remain attuned to an ever-changing landscape**. We have seen in recent years the near-Knightian uncertainty policy makers endured and how boldly they responded. The ECB was among the first central banks to react to the outbreak of the financial turmoil in August 2007 in providing liquidity to distressed institutions. Another example of flexibility by ourselves and in the wider central banking community is in the swap agreements with other central banks as an example of internationally co-ordinated means of swiftly responding to the crisis.

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<sup>21</sup> For example: European Commission (2002, 2005a, 2005b, 2010), International Monetary Fund (2004), Organization for Economic Co-operation and Development (1997, 2003, 2006).

<sup>22</sup> European Council (2010).

<sup>23</sup> Macroeconomic assessments of the gains that might be realized in the euro area from greater competition and other structural reforms can be found in, for example, Bayoumi et al. (2004), Ebbinghaus and Eichhorst (2006), Jacobi and Kluve (2006), Gomes et al. (2011).

Since then, we acted with what I have previously (here in Jackson Hole) called “credible alertness”.<sup>24</sup> This includes implementing both non-standard monetary policies and our interest rate policy. Interest rate policy depends on the outlook for price stability. The use of non-standard measures depends on the functioning of the monetary policy transmission and must be commensurate with the level of malfunctioning or disruption of money and financial markets and segments of markets. Our non-standard measures do not in any way impinge upon our capacity to design our monetary policy stance to deliver price stability in the medium term.

Despite all the ups and down of recent years, our key challenge remains as it has always been: to create strong, sustainable, balanced, non-inflationary growth. Credibility and the medium-term orientation in monetary policy allows, where needed, scope and flexibility to address various types of severe shocks. Over the long-term a commitment to price stability anchors expectations, improves the workings of the price mechanism, reduces transaction costs, protects savers and reduces uncertainty. This is what I meant at the outset when I said that the theory and practice of monetary policy making paralleled developments in growth theory – namely, both are now seen to hinge on institutional quality.

## V. Conclusions

Let me conclude. Ultimately growth is driven by technical progress. This is especially important where there are limiting demographic factors. In the euro area, there is ample of scope to realize efficiency gains from existing and prospective technological changes given structural reforms and more vigilant implementation of the existing policy agenda. The remarkable resilience of the German labour market in the last few years<sup>25</sup>, where wage moderation and flexible time accounting shielded the economy from excessive job destruction, illustrates admirably the promise of well-structured reforms.

Although there have been improvements in the euro area in recent years, there is still evidence of regulatory and market-based barriers to entry in selected professions which have to be actively corrected.

Structural reforms – re-training, improving job matching, providing flexibility and incentives for job creation and innovation – remain the best policy options for encouraging well-balanced growth, and an environment of low and credible inflation the best environment to encourage matters from a central-banking perspective.

Likewise, alertness against savings and trade imbalances across the global economy is a fundamental concern. Such imbalances – if unchecked or conveniently rationalized away – make our entire, inter-connected economies more fragile and more risk prone. We have seen how rapidly negative financial impulses can transmit through the global economy and pull down economic activity. Alertness means alertness. I have learned whilst discussing global imbalances and financial transmission channels – much of it done here at Jackson Hole – that appropriate improvements in regulation and multilateral surveillance frameworks can yield large gains. We should work hard to maintain momentum.

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<sup>24</sup> “Monetary Policy and Credible Alertness”, J. C. Trichet, Jackson Hole Symposium, August 2005.

<sup>25</sup> For example, Arpaia, A. and G. Mourre (2011), Boysen-Hogrefe and Groll (2011), Burda and Hunt (2011).

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## Presentation's charts

**Table I. Average rates of growth and contributions (1995-2007)**

	Growth rate of output	Contribution to growth from		Labour productivity contributions from			
		Hours worked	Labour productivity	Labour composition	ICT capital per hour	Non ICT capital per hour	TFP
	1=2+3	2	3	4	5	6	7=3-(4+5+6)
Euro area	2.2	0.6	1.7	0.1	0.4	0.6	0.6
US	3.5	0.6	2.9	0.3	1.0	0.6	1.1
Austria	2.7	0.4	2.4	0.2	0.5	0.2	1.5
Belgium	2.5	0.5	2.0	0.2	0.9	0.6	0.2
Finland	4.5	1.0	3.5	0.1	0.6	0.2	2.5
France	2.5	0.4	2.1	0.4	0.3	0.5	0.9
Germany	1.3	-0.3	1.7	0.0	0.5	0.5	0.7
Ireland	7.6	2.1	5.5	0.3	0.4	3.3	1.6
Italy	1.7	0.7	1.0	0.1	0.3	0.7	-0.2
Netherlands	3.1	0.7	2.4	0.3	0.5	0.6	1.0
Spain	3.5	2.0	1.5	0.4	0.5	1.4	-0.7

Source: EUKLEMS database

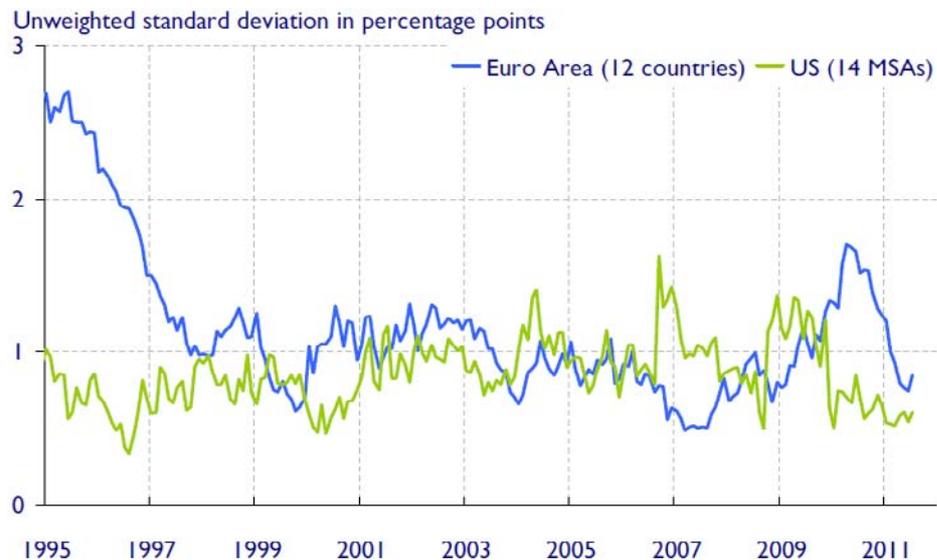
**Table 2. Average rates of TFP growth and sectoral contributions (1995-2007)**

	TFP	Goods Production	Market Services (except Distributive Trades)	Distributive Trades
	1=2+3+4	2	3	4
EA	0.5	0.5 (0.44)	-0.1 (0.35)	0.2 (0.21)
US	1.1	0.4 (0.36)	0.1 (0.42)	0.5 (0.22)

Source: EUKLEMS database.

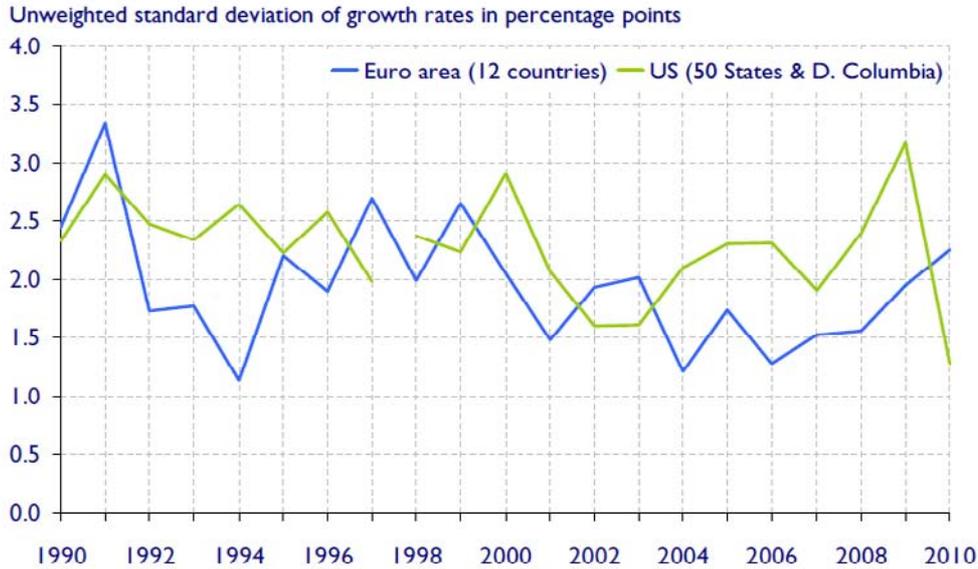
Notes: Goods production captures manufacturing, agriculture, mining, electricity and construction. Differences stem from rounding effects. Figures in brackets denote the shares of value added of the respective sector in the private sector value added

**Chart I. Dispersion of Annual Inflation**



Sources: Eurostat, US Bureau of Labor Statistics, ECB calculations  
Note: MSAs: Metropolitan Statistical Areas

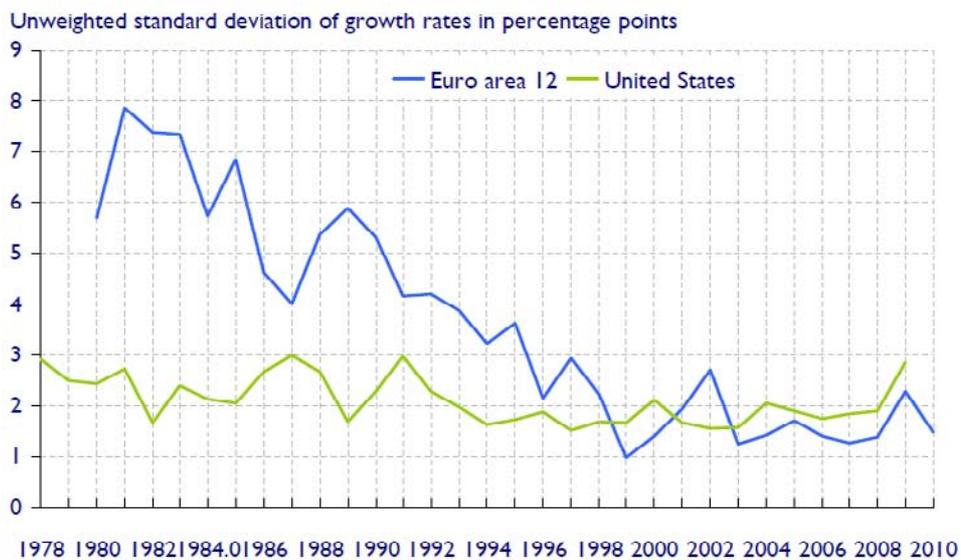
## Chart 2. Dispersion of Real GDP Growth



Sources: European Commission, US Bureau of Economic Analysis, ECB calculations

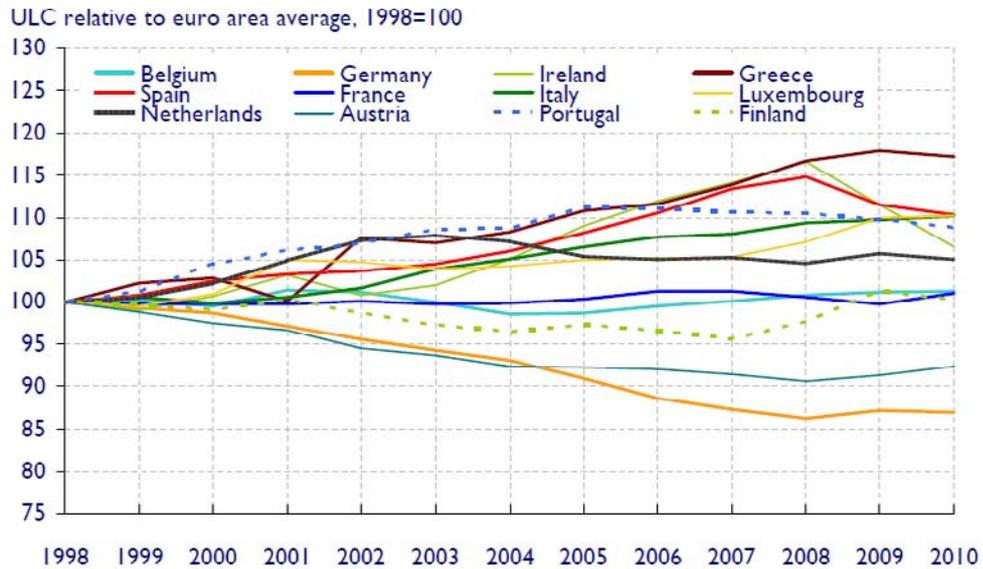
Note: There is a statistical break in the US regional data in 1998. For the US States the data refer to Gross Domestic Product (GDP) by state.

## Chart 3. Dispersion of Unit Labour Cost



Sources: European Commission, US Bureau of Labor Statistics and US Bureau of Economic Analysis

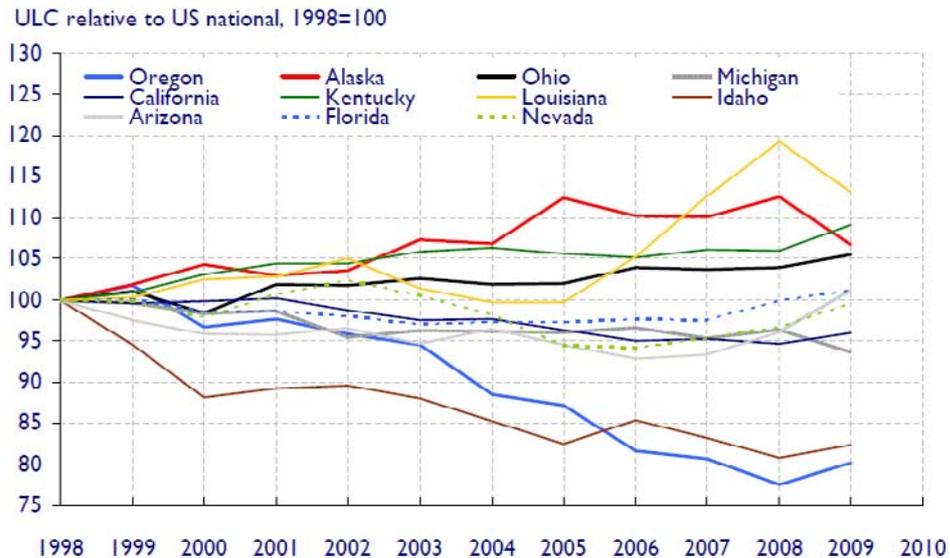
## Chart 4. ULC Dynamics in the Euro Area



Source: European Commission

Note: ULCs are computed as the ratio between compensation per employee and real GDP per employed person

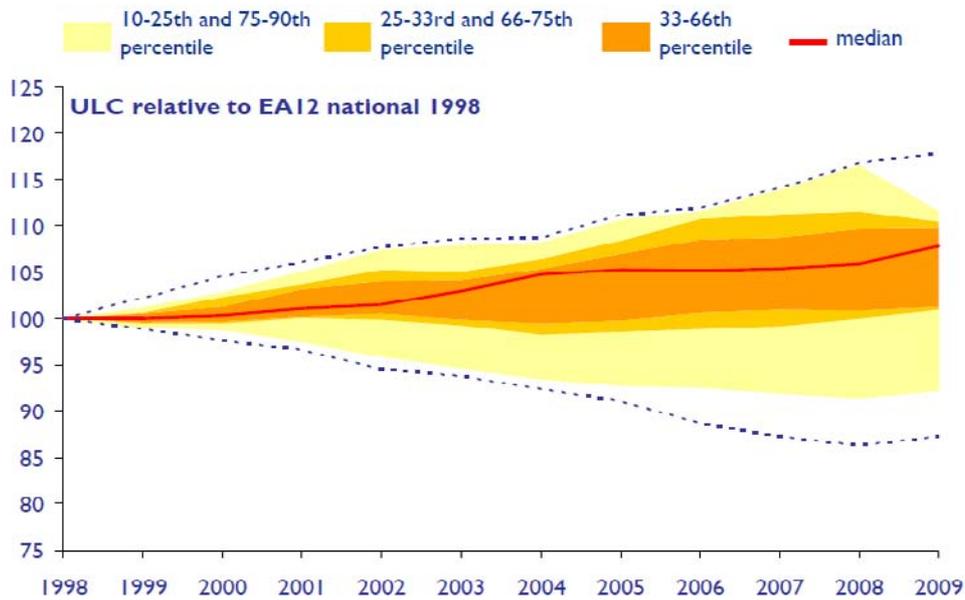
## Chart 5. ULC Dynamics in the United States



Source: US Bureau of Economic Analysis

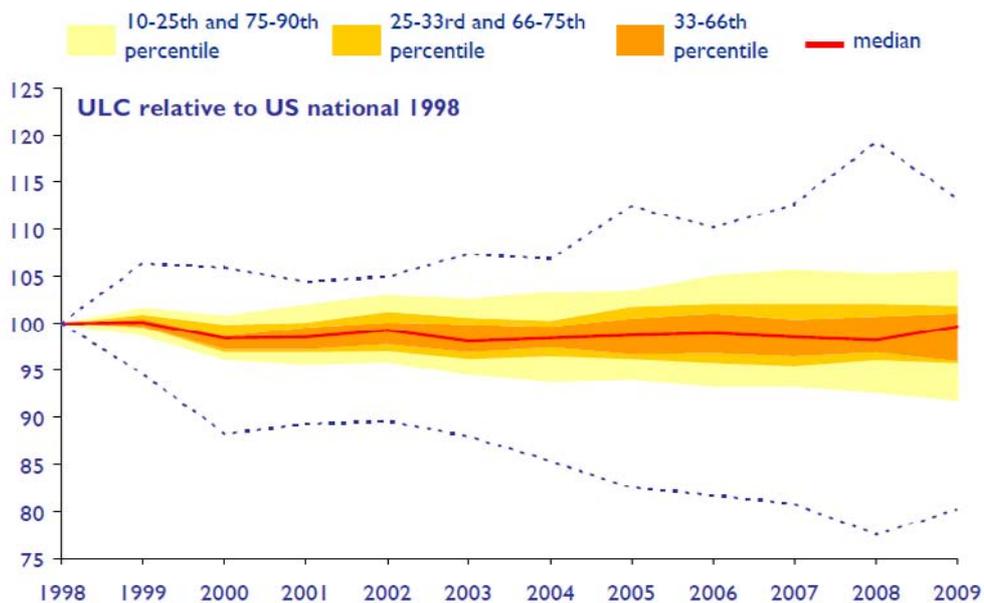
Note: ULCs are computed as the ratio between compensation per nonfarm employee and real GDP per employed person.

## Chart 6. ULC Dynamics in the Euro Area



Source: European Commission  
 Note: ULCs are computed as the ratio between compensation per employee and real GDP per employed person.

## Chart 7. ULC Dynamics in the United States



Source: US Bureau of Economic Analysis  
 Note: ULCs are computed as the ratio between compensation per nonfarm employee and real GDP per employed person.