Comment on "Sources and Mechanisms of Stagnation and Impaired Growth in Advanced Economies" by Robert Hall

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1 Introduction

This paper has a very useful growth accounting of labor income in 6 advanced industrialized economies. It offers an important basis for accounting for income growth in the past 14 years, but the latter half of this period is increasingly being identified with stagnation. This discussion is organized as follows. First, I highlight two stylized facts based on the paper. Then I discuss the core of the work which is labor income growth accounting. This decomposition splits the growth in real labor income into 7 different components. I present the decomposition in a slightly different way than Hall does in his paper. I then discuss interpretations and suggest that modern New Keynesian theory can be quite helpful in understanding what is going on. There I highlight some disagreement I have with Hall about the source of the slowdown in growth arguing that demand may have accounted for more than he suggests.

2 Hall's stylized facts

The term "stylized fact" was invented by the macroeconomist Nicholas Kaldor, because in macroeconomics we never have firm facts. Instead, we observe broad tendencies. There always seem to be exceptions to the overall pattern, hence the qualifier "stylized". I would like to propose two stylized facts based on Hall's paper.

2.1 Stylized fact #1

The Great Recession marked a strong fall in labor per capita, shown in Figure 1 in Hall's paper. Importantly, this figure is income per member of the population. It has been falling or growing slower ever since the economic crisis started in 2008. One of the things Hall emphasizes is that the performances of the six countries he considers are quite different, especially across France, Germany, Italy and Spain. He suggests that an implication of this is that no unitary theory is useful to think about this stylized fact. My theme is somewhat counter to that. My reading is that all six countries were subject to a crisis shock, or what I will term as a fall in the natural rate of interest.

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The thing that explains the different outcomes is that each of the EURO countries (France, Germany, Italy, Spain) was hit to a different extent, with Germany being the least affected. Yet, they were forced to have a single monetary policy. New Keynesian theory then predicts we should observe very different outcomes across these four counties. Meanwhile, UK and US had their own monetary policy. Accordingly, the recessions in those countries was not quite as bad as the worst hit European countries. If one plots up the average income growth in the Eurozone and compares to US and UK, the patterns look a bit more similar across the countries than Figure 1 implies, more on this at the end of the comment.

2.2 Stylized fact #2

A large part of the fall in labor income can be explained by a fall in the share of income that goes to labor or what we term labor share. This appears to apply to all countries with the exception of Germany[113]. Here we see that this drop becomes more severe right around the crisis.

3 Hall's labor income growth accounting

How can we account for the drop of income per member of population? The key innovation of the paper is to propose a simple and useful accounting framework, akin to growth accounting. Relatively to typical growth accounting, the main innovation is to go into much more detail in the volume of labor input, L_t, and allowing for time-varying share that goes to labor income, α_t. The decomposition works as follows: the volume of labor in the economy, L_t, is drawn from the total population, N_t, of which only a fraction is of working age, H_t/N_t. Out of H_t, however, only a fraction are a member of the labor force, i.e. either working or looking for work, F_t/H_t. Next, out of labor force, F_t, only a fraction is employed, e_t. Finally, for every person employed, there may be variations in how many hours every employed worker works in the workforce, h_t. Accordingly, we can decompose labor input changes into these 4 different margins: variations in working age of the population, labor force participation, employment/unemployment rate, and hours work per working member.

Then Hall takes account of the share of income that goes to labor. If we assume Cobb Douglas production function, $Y_t = A_t K_t^{1-\alpha_t} L_t^{\alpha_t}$, that would be given by α_t, but here A_t is total factor productivity (TFP) and K_t is capital. Hall takes account of the contribution of capital accumulation in his decomposition, which he shows can be captured by the capital output ratio K_t/Y_t, and finally, total factor productivity A_t. This is a simple and useful way to look at the data. As with all good ideas one wonders why it has not been done before.

The Hall labor income decomposition has a very nice interpretation. Let us say that the income growth per member of population over a few years is 1 trillion. Then we

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[113] One thing that is a little bit of a puzzle to me, compared to other papers presented in the conference, is the absence of any fall in labor share in Germany. This might be worth looking further into.

can, as a matter of accounting, decompose it into: change in labor inputs, i.e. (i) working age to total population, (ii) labor force participation, (iii) employment rate, and (iv) hours per worker. Change in capital input given by the (v) capital output ratio. Change in (vi) total factor productivity. And finally change in (vii) the labor share. The point is that these growth rates should all sum up to the total. This suggests a natural way to visualize Hall's accounting results which I do below for each of the 6 countries. I can take no credit for the numbers, I am simply reporting Hall's income accounting results that he generously shared with me prior to this conference.
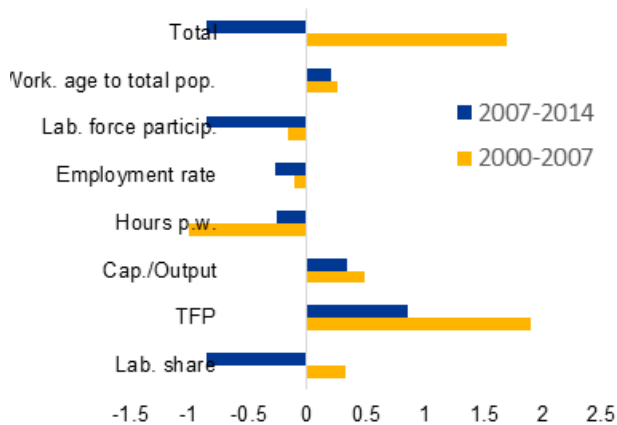
In blue color is the period 2007-2014, in orange color the period 2000-2007 for the US in Chart 1. We see on top the total income growth measured in annualized growth rates. Labor income grew in 2000-2007 by a 1.7 percent per year, while it fell in the period 2007-2014 and contracted by about 0.8 percent per year. These two numbers are represented by the two top bars. Below the two bars, we see decomposition of the overall growth rates into the 7 different contributing factors, all of which sum up to the total[114]. For the US the largest part of the drop in labor income is explained by the decline in labor force participation as well as the fall in the labor share. We also see that the slowdown in TFP growth played a significant role, even if it did not dip into negative territory. To sum up for the US, the three main factors playing the biggest role appear to be the fall in labor force participation, decline in labor share and slower growth of TFP. Declines in employment rates, capital accumulation and working age play a smaller role in accounting for the slower growth in labor income.

Moving to Spain in Chart 2, we also see a sharp turn from growth in labor income in 2000-2007 to contraction in 2007-2014. Explaining this is again a decline in the volume of labor as in the case of the US. But this fall in the volume of labor is not due to a fall in labor force participation as in the US. Instead it is due to a fall in the employment rate and to some extent hours per worker. The second main element is a fall in labor share. TFP is not doing a whole lot in Spain to account for the fall in labor income growth, in contrast to the US.

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[114] While the 7 factors should sum up to the total, there is a discrepancy. This is because the data are not compiled exactly in the same way as the theory. Sorting out the source of the difference is a topic for future research.
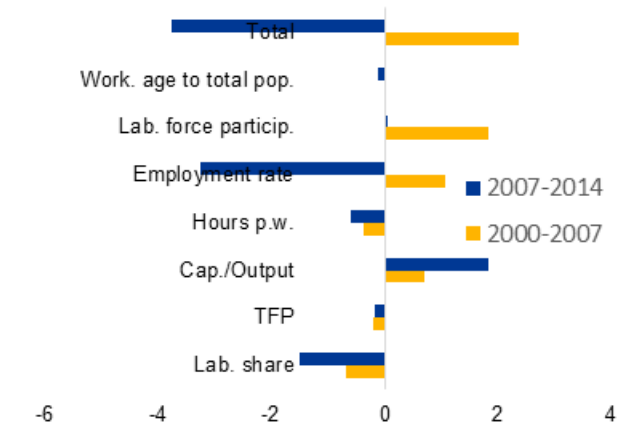
Chart 1

Labor income growth per capita: United States

Sources: Hall (2017).

Chart 2

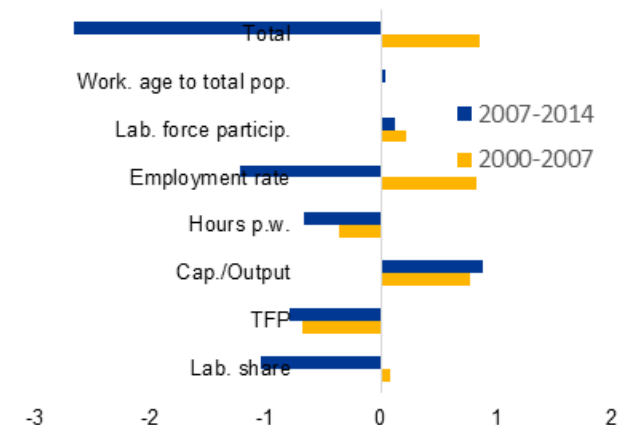### Labor income growth per capita: Spain

Sources: Hall (2017).

Moving to Italy in Chart 3, again there is sharp difference in overall developments in two periods, with modest income growth in the period 2000-2007 being replaced by a contraction. Again, we also see the volume of labor input falling. But here it is a combination of the employment rate and hours worked. Again the labor share is declining. As in the case of Spain, we do not see much going on in TFP. Note the difference in scale for Italy vs. Spain, the fall in income is bigger in Spain.

As seen in Chart 4, France is somewhat similar to Italy and Spain, even if the fall in real labor income is smaller. Again you see that the volume of labor is the factor contributing the most to the decline in income. In this case it is both the employment rate and hours per worker. Yet again labor share was falling. You do see analogies here in US, Italy, Spain and France: Fall in labor input and contraction in labor share. The key difference is what measure of labor input is falling.
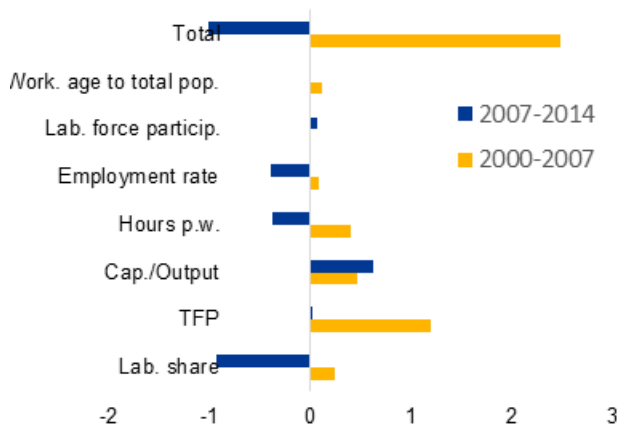
Chart 3

Labor income growth per capita: Italy

Sources: Hall (2017).

Chart 4

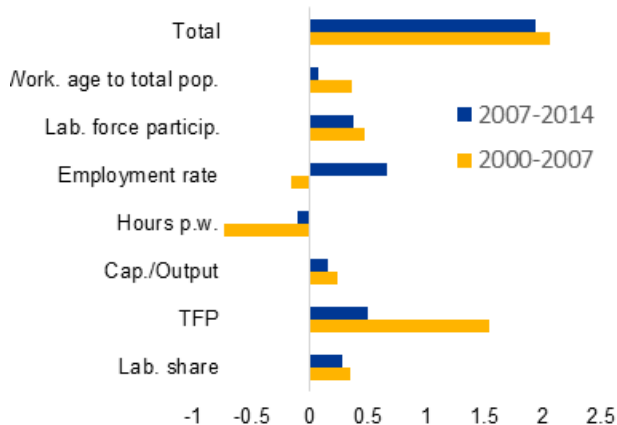### Labor income growth per capita: France

Sources: Hall (2017).

The last member of the Eurozone that is accounted for is Germany. Here we can see that there appears to be little stagnation in income growth. As I had already mentioned, I think one explanation is that Germany, Spain, Italy and France were constrained to have the same monetary policy during this time period even if they were hit differently by the financial crisis. Under this interpretation the policy by the ECB was consistent with full utilization of labor inputs in Germany, but not so in the other EURO countries, especially in Italy and Spain. It is thus the combination of asymmetric demand shocks and a single monetary policy that explains the different outcomes.

Perhaps a bit of an odd man out here is UK shown in Chart 6, at least in terms of the decomposition. As in the other countries, with the exception of Germany, we see a dramatic move from labor income growth to stagnation in the aggregate numbers. The decomposition differs, however. What seems to be driving the slowdown in labor income appears to be primarily the fall in TFP rather than in any measure of labor input (even if we also see a decline in the labor share here). One interpretation of the UK is that with its independent monetary policy it did more to offset the shock than the other countries. One indication of this is that inflation did not significantly undershoot in the UK, in contrast to the other stagnating economies. More than any of the other countries, however, UK was a financial center that was seriously hit by the crisis. Perhaps one should then not be too surprised to see the crisis spilling into TFP.
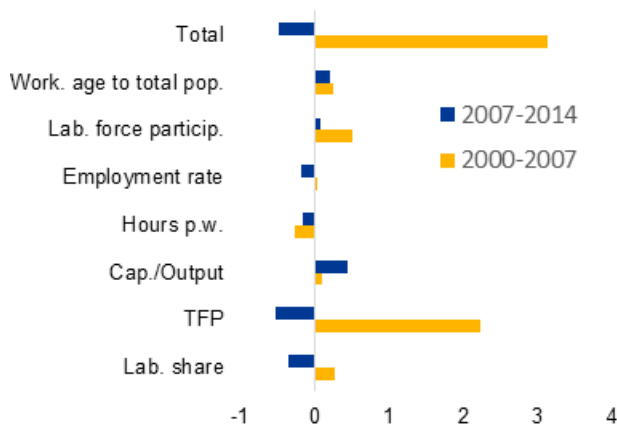
Chart 5

Labor income growth per capita: Germany

Sources: Hall (2017).

Chart 6

Labor income growth per capita: UK

Sources: Hall (2017).

4   What have we learned from Hall income accounting?

It is by no means a criticism to say that I think the numbers presented above will probably not be the final word on accounting for differences in labor income growth in this period in the six countries. Behind these calculations are a lot of data and institutional details, all of which will be subject to increased scrutiny and revision in coming years. The evidence above, therefore, is only suggestive at this stage. The

discussion above, however, gives an idea of the kind of questions Hall's labor income accounting can address. Let me highlight a few things I think we have learned. Perhaps the most useful thing to highlight is what factors we can exclude as candidates in explaining the stagnation in labor income. First, aging does not account for much. The contribution of the decline in the working age to total population is not too important in any of the countries. The aging story is one popular narrative to explain stagnation, and this is suggesting that aging is not driving the drop in the volume of labor input in any of the 6 countries[115]. Second, lack of investment is not the story. In none of these countries can a fall in capital to output account for much. Low investment, perhaps due to financial frictions that applied with greater force than normal in the crisis, is one popular narrative for the sluggish income growth since 2007. Hall's labor income accounting does not support this hypothesis. Finally, it is common to think of TFP as an important driver of variation in income over time. TFP tells no consistent story across these 6 countries. It appears to be all over the map.

So what is the story? Let me offer two observations. First, France, Italy and Spain all see a drop in labor input, via employment rate and hours worked. In US, however, this shows up as drop in labor force participation. Why does the drop in labor input show up differently in US vs. EU countries during this stagnation period? Many have suggested that the fall in labor force participation in the US is unrelated to the crisis. I am skeptical of this viewpoint. If the fall in labor participation was unrelated to the crisis, then why did labor participation not also fall in other advanced economies? The sharp steep drop in labor participation right around the crisis seems too stark to be chalked out as a coincidence. I think a more reasonable interpretation is that labor input fell in all four countries for the very same reason: it was a response to an aggregate demand shock, that ultimately had its roots in the financial crisis (e.g. due to a debt deleveraging shock as in Eggertsson and Krugman (2012) or shock to liquidity of financial assets as in Del Negro, Eggertsson, Ferrero and Kiyotaki (2017). But this demand shock affected labor input differently in different countries. Why? Let me suggest that the reason is different labor market institutions. In any event, this is a key question to be debated. Second, all countries except Germany have a fall in labor share, violating a key Kaldor fact. What is the driver of this? This is a wide open question, for which I do not have much concrete suggestions for. I have long thought that in the US it had something to do with an increase in monopoly power of firms. But given the fall in labor share in Europe mirrors quite closely what happened in the US, is it a reasonable explanation? I have heard many argue that an increase in monopoly power of firms is a hard story to tell in Europe during this conference. Let me also suggest that it seems somewhat hard not to suspect that this fall had something to do with the large demand shock observed in 2008. Yet, I am not aware of any theory that accounts for this pattern working through aggregate demand.

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[115] Work such as Eggertsson and Mehrotra (2014) has suggested that aging could instead lead to demand stagnation by driving down the natural rate of interest. There is nothing in the decomposition that is inconsistent with that idea, as it works through aggregate savings.

5   Differences in interpretation

I have so far highlighted Hall's labor income accounting and how I interpret it. It seems only fair to highlight, however, that my own interpretation is quite a bit different from Hall's. I view this more as a feature than a flaw of his suggested accounting framework. It is a tool for representing the data rather than a structural method that gives concrete conclusion. Hall proposes that the first stylized fact is most plausibly explained by supply than demand factors. He appears to base this assessment to a large extent on the fact that the employment rate (or unemployment) has recovered to pre-crisis level in both the US and the UK. I think it is worth emphasizing, however, that there is no theoretical reason why slack demand has to show up only via only this one measure of labor input, that is employment rate. I see no reason why low demand cannot also show up in lower labor participation or hours worked. Indeed, as I have already suggested, perhaps "labor rationing" in response to subpar aggregate demand is just happening via different mechanisms in different countries depending on different labor market institutions. Furthermore, there seems no reason to believe that demand cannot show up in TFP as shown for example in Garga and Singh (2017) via mechanisms of endogenous innovation.

The bottom line is I do not see anything here in the results that suggests that the slowdown in income growth during this period was not driven by aggregate demand. It remains the prime suspect in my mind due to the financial crisis. Does this matter? Yes, because if we say that demand is not driving the subpar income growth, we give monetary policy a free pass. I think this would be a big mistake, especially here in Europe. Also, it ignores the obvious thing that these countries all have in common. What is it? Or put it differently: what does theory predict we should expect in a demand driven recession? New Keynesian theory, see e.g. Eggertsson and Woodford (2003), models a demand shock as a decline in the natural rate of interest, that is, the real interest rate for all resources to be fully utilized. Later literature established that this drop could either be modeled as household debt deleveraging shocks, or stemming from turbulence in the banking sector (see e.g. Benigno, Eggertsson and Romei (2014). Meanwhile, Eggertsson, Mehrotra and Robbins (2014) show that there is no reason to expect this shock to revert quickly, or even at all (what has been termed the secular stagnation hypothesis, see Summers (2017) and see Eggertsson, Mehrotra, Singh and Summers (2017) for an international perspective). What is the prediction of a demand shock that leads the natural rate of interest to be negative? The key prediction is i) nominal interest rate collapse to zero, ii) inflation undershoots its target and iii) output is below potential (and accordingly labor income growth should be expected to be subpar). Let me suggest to you that what we observe in the data in these 6 countries is consistent with i)-iii).
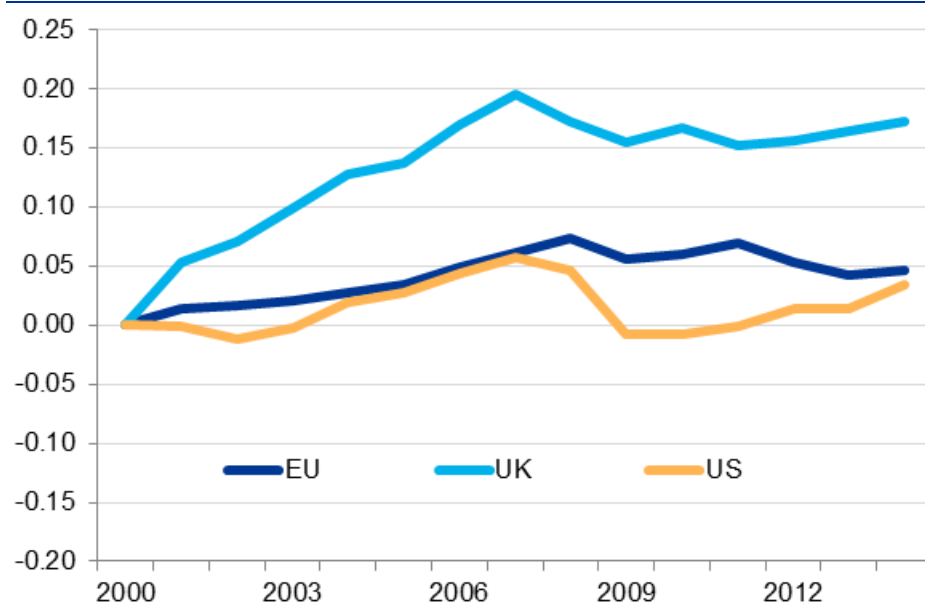
6   Conclusions

The figure below summarizes Figure 1 in Hall's paper slightly differently. It shows the labor income growth in the EURO zone aggregating together France, Germany, Italy, Spain with a blue line. It compares it to the two other currency areas Hall considers,

i.e. US and the UK. Hall's stylized fact #1 now seems more apparent even to an extent one does not need the qualifier "stylized" anymore. Labor income growth per capita slowed down markedly around the crisis across these three currency areas. It still seems anemic. Taken as a whole the EURO area does not look all that different to the US or UK. The different outcomes in Germany vs. France vs. Italy vs. Spain are then most plausibly explained by the fact that they got very differently hit by the financial crisis. Yet, they were forced to adopt a single monetary policy. This unitary demand theory then explains why Spain did so much worse than Germany. At the heart of it is a common demand shock tied to the financial crisis and nominal frictions in the New Keynesian tradition. The theory also gives a natural explanation for the anemic growth. The story is simply that none of these economies could cut the real interest rate sufficiently to accommodate the shocks due to the zero lower bound. Stories about the anemic growth, i.e. why recession lasted for so long and why the recovery was so week, then become stories about why the shock was so persistent. The literature on secular stagnation, see e.g. Eggertsson, Mehrotra and Robbins (2017), fleshes out these type of stories theoretically and quantitatively. I think they do a reasonable job. Therefore, I do not think we need to throw up our hands and say that no unitary theory of these developments is useful. We have that theory.

Chart 7
Real Compensation per Member of the Population

If one adopts this perspective, as I do, Hall's decomposition does pose several serious challenges. One challenge is to explain why slow growth showed up in lower labor force participation in US, but instead in lower employment rate in the EURO area. Different labor market institutions might be helpful here. A second challenge is to explain the very different behavior of TFP across the different countries and especially if it can be modeled as driven by the demand shock. Recent work on hysteresis effects may be of help here, see e.g. Garga and Singh (2017). A third challenge is that Hall clearly documents a fall in labor share in all countries above,

with the exception of Germany. I think we still do not have a good theory of what is driving this.

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