

Cardiff University

Submission to the Joint Expert Panel – Second Phase

This document has been prepared in consultation with Cardiff University's USS Actuarial Valuation Technical Group on behalf of the University and its USS members to provide input into the first part of the second phase of the Joint Expert Panel's work on the USS valuation. It provides comments on the subjects outlined in the call for submissions and considered by the first part of the JEP's work, and views on improvements that could be made to the valuation process and governance.

The Panel is seeking submissions from stakeholders and others on the following subjects. Cardiff University's response follows:

- The roles and involvement of UCU and UUK in the valuation process so that a more collaborative approach could be adopted.

There has not been a sufficient level of trust and openness between USS, UCU and UUK in the current valuation process. Cardiff University therefore welcomes the role of the JEP in providing UCU and UUK with an independent examination of the valuation of the USS.

- An examination of the interaction of the various bodies with a formal role in the valuation process, including the trustee and the JNC.

The valuation process would benefit from more openness and a commitment to data sharing by the trustee. Openness on its own is necessary but not sufficient without improved communication and engagement. We see the continuation of the JEP as helpful but this should be within the formal governance framework for the valuation process to ensure a genuinely collaborative approach.

- The potential for the involvement of Scheme members in the valuation process and how more effective engagement with employers can be achieved.

We would welcome greater involvement of Scheme members in the valuation process, in particular representation for the large number of ordinary members who are not already represented by UCU. The structure of the JNC is also very limited and would benefit from being broader, including representation of members from different sector mission groups.

The Panel is particularly interested in views on improvements that could be made to:

- The valuation process, and decision-making (rather than, at this stage of its deliberations, the methodology) and in particular the content and timing of different aspects of the process and engagement between the scheme and the various stakeholders; and

We are keen to support both parties through the current short-term pressures arising from the 2017 valuation and the implementation of the default cost sharing arrangements. We would like to see greater transparency in the assumptions adopted by the trustee, possibly using forecast data from an independent party such as the Office for Budget Responsibility. We draw the Panel's attention to the letter from Dr Woon Wong to the Pensions Regulator dated 2nd March 2019 (copy attached).

Going forward the valuation and decision-making processes need to change. There needs to be an open debate to explore the views of all interested parties and to avoid having these discussions on a rolling three-year basis. We recognise that changes need to be appropriate and that all parties agree to them.

- The governance of the valuation process and in particular the role of different parties including UUK, UCU, the JNC, the trustees and others in providing that governance.

We have concerns about the appropriateness of the governance arrangements around the valuation process, which is clearly not delivering outcomes that all stakeholders are willing to accept. We have particular concerns about the JNC, how it functions and its oversight role. Alternative governance models should be explored to learn from best practice in other sectors or schemes. If the governance of the JNC does not change then thought should be given to improving support for members so they are better enabled to make informed decisions that everyone feels comfortable with.

If a major change is envisaged in investment strategy, benefits or contribution rates we would like to see it announced early with an agreed future implementation date that allows members and employers to plan their affairs efficiently.

Mie Birch
Director of Supervision
The Pensions Regulator
Sent via email (wb@tpr.gov.uk)

2 March 2019

Dear Mr Birch

Un-evidenced assumptions as ‘moving goalposts’ in 2017 and 2018 valuations of USS

Summary and key message

It has long been suspected that falling gilt yields overstate the liability of defined benefit schemes. In November 2014, Professors Jane Hutton and Saul Jacka of Warwick University wrote to USS to point out that the 2014 deficit was the outcome of lower gilt yields rather than any true funding shortfall. It is therefore shocking to find that, based on projected benefit payments data available from the University Superannuation Scheme (USS), gilt-plus discount rates actually reduce the 2017 deficit of USS from £7.5bn to £3.4bn. The finding makes the reason behind the 2017 deficit of USS ever more puzzling since the valuation assumes that interest rates would revert back to the 2014 level in ten years’ time (thereby implying a liability lower than that obtained by a gilt-plus method).

If evidence-based discount rates are used, the scheme is found to be in a surplus that can be as large as £7.5bn; see Table 1 below. The fallacious assumptions that underpin the 2017 valuation are akin to ‘moving goalposts’, turning the surplus of the USS into a deficit. Moreover, it is only after Dr Sam Marsh of University of Sheffield, a member of the Joint Negotiation Committee (JNC) representing University and College Union (UCU), obtained the projected benefit payments data from USS that the findings reported in this letter are made possible. Prior to Dr Marsh becoming a member of JNC, USS refused his repeated requests for such information. This is a serious matter as the 2017 deficit led Universities UK (UUK) to force through a decision to close the defined benefit scheme of USS, which in turn prompted the largest strike in British higher education history (an estimated 42,000 staff went on strike with 575,000 teaching hours being lost, affecting more than a million students).

Table 1: Liability of USS under various discount rate assumptions

	Liability	Deficit/Surplus
USS 2017 valuation	£67.5bn	£7.5bn deficit
Gilt-plus discount rates	£63.4bn	£3.4bn deficit
Reported discount rates	£58.6bn	£1.4bn surplus
Gilt-plus discount rates with interest rates reversion	£55.5bn	£4.5bn surplus
Evidence-based discount rates	£52.6bn	£7.4bn surplus

The problem with the USS’s valuations is related to the discount rate debate that was published by the Pensions Regulator (tPR) in the *2017 Annual Funding Statement*. New findings show that gilt yields do not correlate with (long term) returns on other asset classes and that gilt-plus discount rates understate the true discount rates during the past decade of falling interest rates; see Wong

(2018).ⁱ Since the 2017 valuation assumes that interest rate would revert to its 2014 (higher) level, it is thought that a gilt-plus valuation would produce a deficit that is higher than the reported £7.5bn deficit. It is thus surprising to find that gilt-plus discount rates actually produce a smaller deficit of £3.4bn; see Table 1.

It turns out that the 2017 discount rates reported by USS are actually investment returns. If the reported discount rates are used to discount the future benefit payments, the liability is £58.6bn, implying a surplus of £1.4bn for USS. Moreover, a gilts-plus valuation that takes account of the interest rate reversion produces a surplus of £4.5bn. Finally, if the downward bias in gilt-plus discount rates is rectified according to research evidence, without assuming interest rate reversion, the surplus of USS increases to £7.4bn.

Note that since the 2018 valuation uses the same actuarial assumptions as the 2017 valuation, the findings reported in this letter also apply to the 2018 valuation. This means that simply continuing the 2014 gilt-plus approach (which counterfactually inflates the liability), the funding position of USS will be changed from a deficit of £3.4bn (in 2017 valuation) into a surplus of £0.5bn after the 2018 valuation, without implementing any of the recommendations proposed by the Joint Expert Panel (JEP). Therefore, neither deficit recovery contributions nor automatic trigger contributions are necessary.

A fiduciary duty of trustees is to always act in the best interests of scheme beneficiaries. Inflating the liabilities of the USS based on un-evidenced assumptions is tantamount to trustees breaching their fiduciary duties. A letter dated 21 November 2018 was sent by me to the USS trustees to inform them of the new findings with regard to the discount rate debate, and warn them of the risk of breaching their fiduciary duties. However, no reply has so far been received.

1. Industry debate on discount rate

According to the *2017 Annual Funding Statement*, there is a debate on the approach to discount rates:

The current debate on the approach to discount rates focuses on whether historical relationships between gilt yields and returns on other asset classes still hold true for the future. Proponents of a 'gilts plus' approach (typically meaning a fixed margin above gilts) argue that the historical relationship still holds and low gilt yields mean low returns on other asset classes. Opponents say that the gilt market is distorted and the historical relationship broken. (p. 6)

To appreciate the implication of the debate to the valuation of defined benefit (DB) schemes, consider the following gilt-plus discount rate

where y and m are gilt yield and fixed margin respectively. With m fixed, self-evidently the fall in gilt yields in recent years must be matched by an equal fall in the discount rate, rendering the cost of DB pensions inordinately expensive.

The discount rate is essentially a prudent estimate of return on the assets held by a defined benefit scheme. Therefore, the gilt-plus approach implies that the future returns on risky assets would fall as much as the fall in gilt yield during the recent years. However, research conducted by Wong (2018) and Caballero *et al.* (2017) provide evidence that returns on equities, the most important class of

risky assets, are relatively stable despite the falls in interest rates in recent decades.ⁱⁱ This is because returns on equities reflect firms' productivity in the real economy. On the other hand, the falls in interest rates since the 1970s are the result of successful monetary policy to control inflations in order to ensure optimal growth for the economy. A stable, growing economy makes businesses profitable which in turn give rise to stable returns on equities.

In short, a gilt-plus discount rate understates the true discount rate during the past decade of falling gilt yields.

2. Gilts-plus discount rates

This section carries out the 2017 valuation by using the same assumptions as in the 2014 gilt-plus discount rates, which are given by

- Years 1-20: Gilts + 1.7% de-risking linearly to Gilts + 1.2% by year 21
- Years 21+: Gilts + 1.2%

Between 31 March 2014 and 31 March 2017, the 30-year gilt yield fell from is c. 3.5% to 1.727%. Therefore, the 2014 gilts-plus approach gives rise to the following discount rates for the 2017 valuation:

- Years 1-20: 3.427% decreasing linearly to 2.927% by year 21
- Years 21+: 2.927%

Using the above discount rates to discount the future benefit payments (provided by USS), the 2017 liability is £63.4bn. Given the assets of £60bn, the deficit is £3.4bn, which is smaller than the deficit of £7.5bn as reported by USS. The finding is surprising because, as the preceding section points out, the gilts-plus discount rates understate the true discount rates. Moreover, the 2017 valuation assumes interest rate reversion so that from 2028 onwards, the discount rates stays mostly between 3.5% and 5%.

3. Investment returns and reported discount rates

This section explains why the 2017 valuation produces a deficit that is larger than that obtained by the downward biased gilt-plus discount rates. First, the *reported discount rates* (denoted as r_t in year t) in the 2017 valuation are shown as follows:

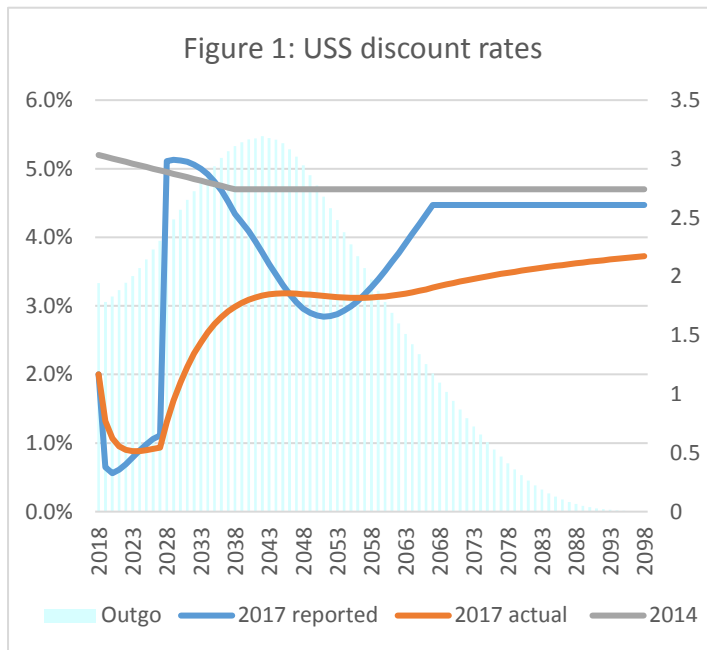
Years 1-10: $CPI - 0.53\%$ reducing linearly to $CPI - 1.32\%$

Years 11-21: $CPI + 2.56\%$ reducing linearly to $CPI + 1.7\%$ by year 21

Years 21 +: $CPI + 1.7\%$

A core assumption in the 2017 valuation is that interest rates would revert back to their 2014 level in ten years' time. A comparison of the 2017 *reported discount rates* with 2014 discount rates (see Figure 1) would appear to be consistent with the assumption (except for the 'dip' around year 2050). This would lead stakeholders of USS to believe that the deficit of £7.5bn is the outcome of using the *reported discount rates* to discount the future outgo, after allowing for interest rate reversion.

However, r_t is actually the investment return rather than discount rate in year t . The *actual discount rate* (d_t) is obtained as



If discount rates are constant or decline slowly due to de-risking, they can be treated as effectively the same as the prudent estimate of investment returns on scheme assets; hence the two terms are sometimes used interchangeably in other sections of this letter as well as in an actuarial report.

The problem with the 2017 valuation is that the *reported discount rates* () begin at a very low level, resulting in significantly lower *actual discount rates* (); see Figure 1. Moreover, the regulation requires the valuation of

technical provisions (i.e. liability) to be carried out on the basis of a closed scheme; the level of outgo becomes negligible from around 2088 onwards. Therefore, the initial low investment returns (as represented by the *reported discount rates*,) give rise to a liability that is even larger than the downward biased gilt-plus discount rates would. Finally, if the future outgo is discounted by the *reported discount rates* (), the liability is only £58.6bn, i.e. a surplus of £1.4bn since the assets are £60bn.

4. Fallacious assumption 1: extreme low investment returns

USS attributes the first ten years of low investment returns (see *reported discount rates* in Figure 1) to high asset prices buoyed by low interest rates and hence a possible market down rating. As the preceding section shows, since the extremely low initial investment returns turns the surplus into deficit, such assumption requires scrutiny. First, note that the first ten years of investment returns average only 0.93% whereas the gilt yield as at the valuation date is 1.73%. There is no evidence for risky assets to underperform riskless gilts by 0.8% per annum for as long as ten years.

Next, a simple historical simulation (a technique commonly used in risk management analysis) is carried out to see how plausible such low investment returns are. Because the USS assets are internationally diversified, MSCI world equities return data from 1971 to 2018 is used. Various percentile ten-year-returns on a portfolio of gilts and world equities are provided in Table 2 below.ⁱⁱⁱ The simulation study shows that investment returns on USS assets would exceed the extremely low return assumption in nine out of ten times. It makes no sense to use an expected return of less than that at the 10% tail to value a defined benefit scheme.

Table 2: Ten-year-percentile returns on a portfolio of world equities and gilts

	5 th	10 th	25 th	33 rd	50 th
Proportion of funds in gilts with 2% yield	Portfolio percentile returns over ten year horizon				
20%	0.58	1.57	4.29	4.86	6.20
40%	0.93	1.68	3.72	4.15	5.15
60%	1.29	1.79	3.14	3.43	4.10

Third, consider the 2008 financial crisis, which is described by the former Federal Reserve chairman Alan Greenspan as a 'once-in-a-century' event. During the market crash, the MSCI world equities return index lost 34% from its peak (in May 2007) to its trough (in February 2019). However, over a ten year period (from May 2007 to May 2017), the average annual rate of return is 7.2%.

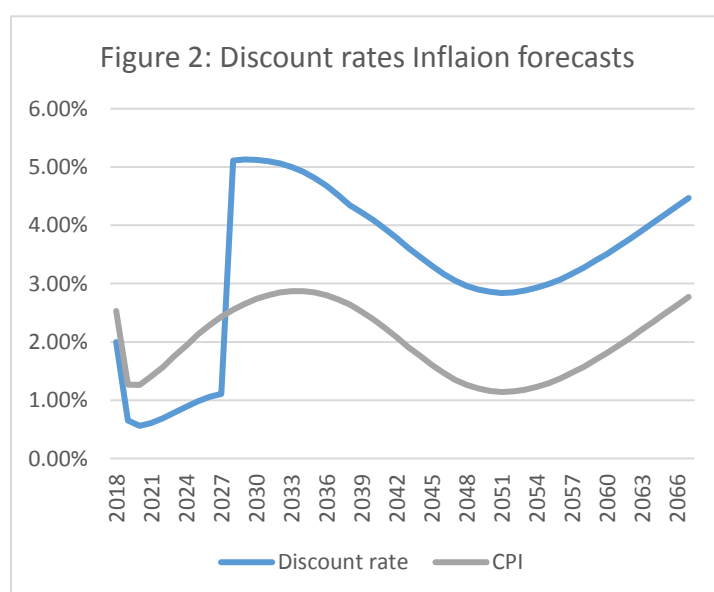
Fourth, if a market down rating were the result of a fall in value of foreign assets due to strengthening of sterling, then the 0.93% annual return for 10 years is simply not justified. A simple illustration is the 6% growth in USS assets amidst the 12% appreciation of sterling against the US dollar between the 2017 and 2018 valuations.

Fifth, it is well known that actively managed funds underperform the market. Assuming a market down rating that results in an extremely low ten year return is a perfect example of such active-investment strategy in market timing. The impact on the value of USS assets due to possible strengthening of sterling is another example of active investment by market timing.

Finally, the discussion on the US interest rate in section 6 further explains the fallacious nature of the market down rating assumption. In short, the extraordinary low investment returns (in the first ten years) run counter to the regulatory guidelines which require assumptions to be evidence-based.

This section ends by noting that the 67th percentile average return of 3.43% on 60% gilts portfolio is similar to the gilt-plus discount rate of 3.427% (1.727% + 1.7%). On the other hand, at the end of the 2014 de-risking plan, discount rate is reduced by 0.5%. Since the current holding of riskless assets in USS is around 20%, the simulation study suggests that the size of the downward bias in a gilt-plus discount rate is roughly $4.86\% - 0.5\% - 3.43\% = 0.93\%$. These points are related to the valuations presented in sections 6 and 7.

5. Fallacious assumption 2: roller coaster discount rates



Forward interest rates are used by USS to construct the required discount rates for valuation. Interestingly, as can be seen from Figure 2, the forward interest rates are such that the discount rates vary like a roller coaster and fall from year 11 onwards for the valuation of self-sufficiency liability at year 2037, as if to ensure that Test 1 will not be passed. However, the doubtful nature of such assumption (on forward interest rates) for the valuation of a DB scheme is obvious when Mervyn King, the former governor of Bank of England whose job involved interest rate

forecasts, and Oxford economist John Kay described the roller coaster-like discount rates as 'strange ones proposed by the scheme's actuaries'.

Also, associated with the roller coaster discount rates are the roller coaster inflation forecasts. The key role of Bank of England is to target inflation at 2% through its monetary policy committee. If the Bank of England provides roller coaster-like inflation forecasts similar to those depicted in Figure 2, rest assured that Mark Carney will lose his job as the present Bank governor.

6. Evidence from US interest rate

The US interest rate provides further crucial evidence with regard to the validity of the assumptions used in the 2017 valuation. The Bloomberg screen below shows the long term interest rates of UK and US. As mentioned earlier, a core assumption in the 2017 valuation is that gilt yields would revert in ten years' time to their 2014 level, when they were similar to the US bond yield. As at 16 January 2019, the US interest rate has recovered from its low and is currently above 3%, not far from its 2014 level. Because of Brexit and other factors, the level of UK gilt yields remains low. The level of US interest rates has several important implications for the 2017 valuation.



First, if the level of interest rates were to determine future return on other asset classes, it would be the US interest rate that calls the shots since the US's economy is the largest in the world. This is particularly relevant to USS because its assets are internationally diversified. Wong (2018) shows that the MSCI world equities index explains 94% of past returns of its assets; if gilt yield is used, the regression R-square is negative. Therefore, it can be concluded that a gilt-plus discount

rate would overstate the liability of USS; see section 7 for details of how this bias can be adjusted.

Second, the assumption that there will be a market down rating as gilt yield rises is flawed. As early as March 2017 (the time of 2017 valuation), the US interest rate is already hovering around 3%. If interest rates did determine the long term returns on equities, any negative effect of gilt yield reversion on the internationally diversified assets of USS would be minimal. Therefore, the assumption of first ten years of extremely low investment returns is simply fallacious.

Finally, the assumption of gilt yield reversion is a plausible one since the US interest rate is now around 3%. Therefore, on the basis of 2014 gilt-plus approach with gilt yield reversion in year 11, the 2017 prudent investment returns are:

- Years 1-10: 3.427% decreasing linearly to 3.177% by year 11
- Years 11-21: 4.925% decreasing linearly to 4.7% by year 21
- Years 21+: 4.7%

Using discount rates obtained from the above investment returns, the 2017 liability of USS becomes £55.5bn, which implies a surplus of £4.5bn.

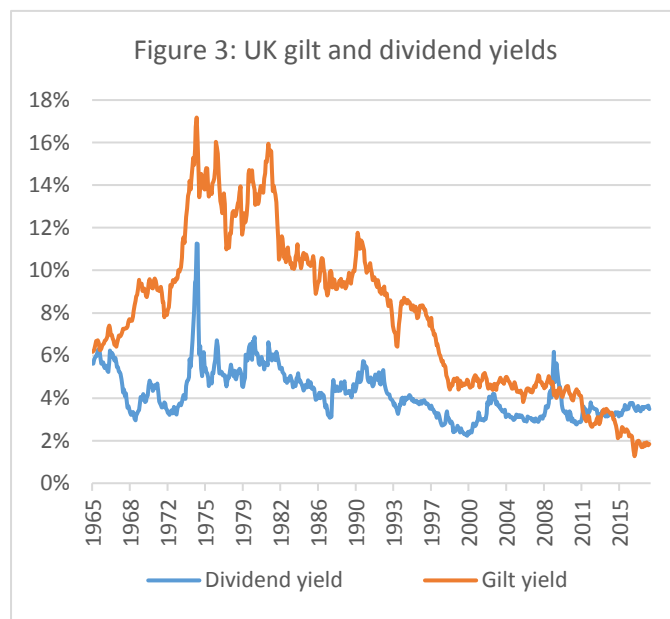
7. Evidence-based discount rates

This section first uses dividend yield and gilt yield in UK as an example to illustrate why a gilt-plus discount rate understates the true discount rate. A correction for the bias is then proposed for the 2017 valuation.

Consider a simple portfolio that comprises only gilts and equities. Let r_g and r_e be the gilt yield and return on equities respectively. The return on the portfolio may be expressed as

$$r_p = \alpha r_e + (1 - \alpha) r_g$$

where α is the proportion of funds allocated to risky assets (i.e. equities). Recent research such as Caballero *et al.* (2017) finds that for US, α (known as equity risk premium) increases since the millennium. This is also evidenced from the spread between gilt and dividend yields in UK; see Figure 3.



Note that nominal gilt yields were high prior to 1990s due to high inflations. Since then, the gilt yield has been on a downward path due to, first price stability as a result of successful monetary policy, then quantitative easing after the financial crisis, and at present the uncertainty caused by Brexit. Throughout the period, the level of dividend yield remains broadly unchanged, except for the low prior to the millennium and high during the recent financial crisis. The return on equities is the sum of dividend yield and growth of firms' profits. Since the latter is dependent on economic growth, the relatively stable dividend yield is consistent with a rising equity risk

premium amidst falling gilt yields.

Now in the case of USS, α is 42.8% in 2017 valuation whereas the gilt yields have fallen by around 2.4% between 2011 and 2017. Since a gilt-plus discount rate assumes (incorrectly) that future returns on equities would fall as much as the gilt yield, it understates the true discount rate by around 2.4% - 1%. The corrected gilt-plus discount rates are thus obtained by adding 1% to the 2014 gilt-plus discount rates in section 2, as given below:

- Years 1-20: 4.427% decreasing linearly to 3.927% by year 21
- Years 21+: 3.927%

The above discount rates are consistent with the 2014 gilt-plus approach, evidence-based and do not assume interest rates reversion. The resulting liability is £52.6bn thereby implying a surplus of £7.4bn. Note that the 2014 liability is £46.9bn. The 12% increase in liabilities is consistent with low inflation (2.5%), meagre wage growth, a rise in active membership and lower life expectancy between 2014 and 2017. Note that the first three factor increase the pension liability whereas the lower life expectancy reduces it.

8. Conclusion

The assumption of interest rate reversion in the 2017 valuation has led stakeholders of USS to believe that the deficit of USS could have been larger if the 2014 gilt-plus approach were continued to be used. However, using projected benefit payments data from USS, gilt-plus discount rates actually reduce the reported deficit from £7.5bn to £3.4bn. An examination of the 2017 valuation finds that its underlying assumptions are un-evidenced and fallacious. Evidence supports the assumption of interest rate reversion. A gilt-plus valuation that takes account of interest rate reversion in the future produces a surplus of £4.5bn for USS. Alternatively, if the bias in the gilt-plus discount rates are corrected, the surplus is £7.4bn.

I have copied this letter to other USS stakeholders. Please do not hesitate to contact me by email if there is anything that needs to be clarified.

Yours sincerely

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Vicky Knight
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ⁱ Wong, W.K., 2018. The Phantom Deficits of the Universities Superannuation Scheme. Cardiff Economics Working Papers E2018/12.

ⁱⁱ Caballero, R.J., Farhi, E., Gourinchas, P., 2017. Rents, technical change, and risk premia. Accounting for secular trends in interest rates, returns on capital, earning yields, and factor shares. *American Economic Review* 107, 614–620.

ⁱⁱⁱ Note that a demean methodology is applied so that the sample geometric average annual return of world equities is reduced from 10.5% to 7.1%. Details can be provided upon request.