

# Equitable Wage

**Abstract:** Do companies pay employees a fair wage? What is a fair wage? This paper takes you through various theories on wages, on old economics and new economics, and on marginal utilities and growth accounting, all these explained without having to resort to any mathematics. These economic theories form the foundation upon which a mathematical expression for fair wage can be constructed. The paper uses case studies of two great British corporations to illustrate how companies might go about to compensate their stakeholders, especially their employees, equitably.

# Equitable Wage

Author: Kok Choy LOH

## Measuring Happiness

If I were to tell you that in 2016 Marks & Spencer paid its workers an equitable wage, you would rightly question, “What do you mean by equitable wage?” And that would be a very fair question. The fact is, until this paper has fully fleshed out the why’s and how’s of an equitable wage, that phrase is just a label — empty words.

So let’s begin at the beginning.

We begin by thinking about the findings of a global survey on happiness. People in different countries were asked, on a scale of zero to ten, to rate how happy they were.[1] So for example, the people in the UK who responded to the survey turned in an average score of 6.714. That means the people in UK were relatively happy. Or at least they thought they were relatively happy. Perhaps you are surprised? Perhaps you see many unhappy faces on your daily commute? Well, that’s the thing about surveys and statistics. An average score of 6.714 does not guarantee that you will find everyone to be relatively happy. It simply says that on balance there are slightly more people who are relatively happy than there are those who are not.

Nonetheless, 6.714 was a creditable score. It placed the UK in the 19th position, one rank below Luxembourg. Norway ranked number one with an average score of 7.537. Singapore came in 26th with a score of 6.572.

In another part of the survey respondents of different income bands were asked to rate their life-satisfaction. And the results showed a clear correlation between life-satisfaction and income. Respondents with high income tended to be more satisfied with life than respondents with low income. This is hardly surprising but it is nice to know that surveys confirm what we believe. This correlation between income and life-satisfaction appears to be quite universal. It held true in the UK and it also held true for practically all other countries surveyed.

The correlation between life-satisfaction and income also has to be interpreted with care. We must not infer from the correlation that everyone with a higher income is more satisfied with his life than everyone with a lower income. Obviously other factors that have nothing to do with income can affect one’s satisfaction and happiness.

Let’s return to the point about surveys and statistics. Any answer regarding happiness and satisfaction, I think, is necessarily a subjective answer. The number, 6.714, has no real cardinal meaning. It certainly does not mean that those respondents were 2% happier than people who scored 6.572. Subjective

measures cannot be interpreted that way. However, it does say that on average people in the UK were happier than people in Singapore. Well, at least people in the UK thought that they were happier.

If a happiness score of 6.714 is a subjective measurement what then might be considered an example of an objective measurement? Weight is an objective measurement. Income is an objective measurement. We can say definitively that an income of £60,000 is 20% greater than an income of £50,000.

All that have been said so far does not imply that objective measurements are superior to subjective measurements. The two are just different, that's all. Objective measurements tend to give us very specific data but they often do not tell us very much. They don't really answer fully what we wish to know. When we want a broader view on a subject matter we have to turn to subjective measurements.

When we are done in this paper we shall see that equitable wage, as that term is used in this paper, is an objective measurement. It has a very narrow focus. An equitable wage might promote employee satisfaction, but an equitable wage will not assure us of employee satisfaction.

Equitable wage has a very narrow focus. If we want a more expansive view on wages, we would have to turn to some of the well known theories on wages.

## **Theories On Wages**

The following question has engaged the minds of the greatest economists — How come wages in the real world constantly defy the law of one price? The law of one price is exactly what it says, that identical goods sell at identical prices. That is the equilibrium price, also known as the market price. It is the price at which buyers are willing to buy and sellers are willing to sell. If one shop sells its goods at higher than the equilibrium price, consumers go to the shop next door. Indeed, in the real world prices of goods seldom move too far from their equilibrium price.

But wages don't behave that way. Wages don't obey the law of one price. Economists have done studies and compared the wages paid by different firms to workers who possessed the same skills and performed the same tasks. They found that the difference in wages between firms was simply too large to be explained by exogenous reasons such as the difference in the cost of travelling to the workplace. What economists found instead was that wages for the same job were higher in firms that were performing better financially. They also found that larger firms paid higher wages than smaller firms.

Why do firms pay more than the equilibrium price for labour? How is it that, unlike goods, wages defy the law of one price?

This is how Carl Shapiro and Nobel laureate Joseph Stiglitz explain why wages vary.[2] They start with a couple of obvious observations. First, it is practically

impossible to spell out every conceivable condition in an employment contract. And second, it is also impractical to actively monitor all workers at all times. So workers have some room for manoeuvring. They can shirk, if they so wish.

According to the Shapiro-Stiglitz theory this is how things play out.

On the production floor, a worker waits until his boss drives off to his weekly production meeting. Then he nips off to the pub for a pint and a yarn with his mates. But what if he is caught skiving and gets fired? No problem. Because the factory down the street is hiring and they pay the same.

Meanwhile at the head office the Chairman barks, “What? Can’t make delivery again?” He fixes his glare on the Production Manager.

The Production Manager visibly shrinks deeper into his seat. “Shirkers. Damn shirkers. I just fired another five,” he moans.

The Human Resource Manager shakes his head and protests, “This firing and hiring, hiring and firing. It’s a merry-go-round!”

Eventually with the help of a cost accountant the firm hatches a plan. The firm raises wages 7%. That raise is enough to make the workers feel the pain if they got fired and had to take a lower wage down the street.

That, in a nutshell, is the Shapiro-Stiglitz explanation how the law of one price lost its grip on wages.

Another Nobel laureate, George Akerlof, and a former Federal Reserves Chairman, Janet Yellen, offer yet another perspective to this mystery why wages defy the law of one price. According to Akerlof and Yellen workers hold a certain view about what a fair wage should be.[3] If their wage falls below their idea of a fair wage, they lower their effort at work accordingly.

Now, it is reasonable to assume that there is a cost to the firm when workers reduce their effort. And it is reasonable to assume that the cost to firms in one industry might be different from the cost to firms in another industry. And even between firms in the same industry the cost might be different.

From these assumptions, they arrive at the following insight. For different industries there is for each firm a certain sweet spot, different for each firm. That sweet spot is where any gains from an incremental increase in workers’ effort balances exactly the cost of paying workers an incremental increase in wage.

That, according to Akerlof and Yellen is why wages drift away from the law of one price.

But from where do workers get their idea regarding what a fair wage should be? Akerlof and Yellen have their ready answer to that too. They think that workers peg their notion of a fair wage against what colleagues are getting.

But how does that explain why wages differ between firms? Here's how. Akerlof and Yellen explain that the number of workers engaged in any particular job varies. It depends on the nature of the firm. Now, imagine that a firm needs a large number of workers for a particular job. But the availability of workers for that particular job is in short supply. That creates a bottleneck in the firm's operation. In order to get the requisite number of workers, the firm pays a premium. But that becomes the reference wage for other workers in the firm. These other workers now peg their notion of their fair wage against this reference wage. So the firm searches for that sweet spot where the gains from an incremental increase in workers' effort balances exactly the cost of paying workers an incremental increase in wage. And so the firm no longer pays wages at the market rate. That's why the same job does not fetch the same wage in different firms.

Besides the Shapiro-Stiglitz and the Akerlof-Yellen theories, there are other wage theories. Let's take just one more. David Blanchflower, Andrew Oswald and Peter Sanfey take a different tack.[4]

Before describing the Blanchflower-Oswald-Sanfey theory, let's see what standard economics textbooks say. According to standard textbooks there is a certain market equilibrium rate of gross income (you probably know gross income as gross profit). And firms in the same industry tend to earn that equilibrium rate of gross income. There is also a corresponding market equilibrium wage that firms are willing to pay. If a firm pays less than the equilibrium wage, its workers desert the firm. If a firm pays above the going wage, workers flock to the firm, and the resulting oversupply depresses the wage. In other words wages always return to their point of equilibrium.

But what happens when a firm earns more than the industry's equilibrium rate of gross income? According to Blanchflower, Oswald and Sanfey, the surplus gross income above the market equilibrium is shared among the firm's stakeholders. (In economics a surplus above the equilibrium is called rent. But in everyday usage rent has an entirely different meaning. So we will stick to surplus. It is more intuitive). Part of the surplus goes to an increase in wage; part goes to an increase in return on capital, and so on.

So according to this theory the actual wage in the real world is the sum of the equilibrium wage plus a share of the surplus in the gross income.

Equitable wage is concerned with determining exactly how much that share of the surplus should be.

Notice how each theory seems to imply a certain causal direction between gross income (or productivity) and wage. On the one hand the Shapiro-Stiglitz theory explains how wage affects productivity (and productivity affects the gross income). On the other hand the Blanchflower-Oswald-Sanfey theory assumes that the gross income surplus explains why wage differs. However, when we consider equitable wage, we would not worry too much over which direction the causal relationship

flows. We only want to know, are employees getting a fair share of the gross income surplus?

## **Self-Interest and The Community**

You might think that Nobel laureate Amartya Sen's book *On Ethics and Economics* [5] has nothing to do with why some firms pay more than the going wage, but it has. In his book Sen laments that the practice of economics is no longer what it used to be. In the past the practice of economics rested upon a moral compass — the same moral compass that guided all other affairs of life. True, the pursuit of self-interest was at the heart of economics even then, as it is today. But ethical considerations were always embedded in that pursuit. Economic solutions then were circumscribed by the overarching concern for the welfare of the community as a whole.

Not so today. Today's economics is founded on the theory that rationality dictates that individuals should be driven by self-interest and only by self-interest. And a complex mathematical edifice has been constructed to help those who can to maximise their individual gains, often at the expense of those who cannot. Take the case of the relentless pursuit to maximise shareholder wealth. That is but a special case of this new economics. Ethics and the welfare of the community have no place in this new economics. Ethics, if at all it has a place in the practice of new economics, is practised only when it is prescribed by law. And even there, one of the roles of this new economics is to devise ways to circumvent such laws.

Amartya Sen argues for the return to the gentler and in his opinion more sustainable old economics.

Here, for example, is a classical clash between the old economics and the new economics. In 2015 the Financial Times reported that a Hong Kong based hedge fund had built a 1% holding on Kyocera's shares.[6] The hedge fund was casting its eyes on the Japanese company's large reserves. It started a campaign to pressure the company to cough up \$4 billion as payout to its shareholders.

That hedge fund was the epitome of the new economics worldview. It is a worldview that says that a corporation's sole purpose is to maximise shareholder wealth.

But Kyocera would have nothing to do with that notion. The company held an entirely different worldview. In fact the Kyocera Chairman is an exemplary practitioner of what Sen calls economics with ethics. The Chairman founded the company based on his philosophy of *Rita no Kokoro*. [7] Loosely translated, the philosophy says that a corporation belongs to a community of stakeholders. Employees, suppliers, shareholders, and society too, make up that community of stakeholders. In fact, Kyocera's Chairman, Kazuo Inamori, had gone so far as to say that he put employees' happiness ahead of shareholders' wealth.

Today new economics still maintains its tight grip on the affairs of the economy. But there are signs that the call for corporate social responsibility is slowly being heard. And corporate social responsibility fits neatly into Amartya Sen's vision for a return to the old economics.

As the elucidation of equitable wage progresses in this paper you will come to realise that despite its very narrow focus as an objective measurement equitable wage is very sharply tilted towards the old economics.

### **Jeremy Bentham and John Stuart Mill**

What is it about old economics that irks adherents of the new economics? Subjective measurements. That's what most irks adherents of new economics. Happiness messes up their tidy mathematical models. How so? Because you can't write a mathematical equation for something as subjective as happiness or satisfaction. Or can't we? Let's see.

We can't really quantify happiness and satisfaction. But that didn't stop two nineteenth-century English philosophers from trying. Jeremy Bentham, and a generation later, John Stuart Mill are credited as the founders of the moral philosophy that has Utilitarianism as its central tenet.[8] The two philosophers were prolific writers. It would take many pages to describe Utilitarianism, let alone their entire moral philosophy. A paragraph or two just won't do. So instead of getting into their philosophy, I shall just briefly describe just one aspect of Utilitarianism — the concept of *util*.

In Utilitarianism, a *util* is a unit of measure for happiness and satisfaction, just as the foot was unit of measure for length and the pound was a unit of measure for weight in the nineteenth century.

So how do we measure using *util*? Imagine this scene. Mother asks her child, "What's your pleasure this morning? We have strawberry cupcake and we have chocolate muffin." The child picks chocolate muffin. This morning, to the child a chocolate muffin has more *util* than a strawberry cupcake.

But left at that the *util* is still too illusive to quantify. We still can't tell by exactly how much more *util* a chocolate muffin has over a strawberry cupcake.

Next we imagine, same child, now an adult. She's at the clothier, Uniqlo. There is a sales promotion and she is interested in the t-shirt and ankle pants. The t-shirt is priced at £19.99 and the ankle-pants at £29.99. She is carrying the store's shopping basket. She throws in four t-shirts. Hesitates. Takes out one t-shirt and throws in a pair of ankle-pants.

What have we learnt from her shopping pattern? Her pattern reveals that:

- A fourth t-shirt offers less satisfaction, i.e., it has less *util*, than the third t-shirt.
- By inference, the third t-shirt has less *util* than the second.
- And the second t-shirt has less *util* than the first.

- A pair of ankle pants has more *util* per £ spent than a fourth t-shirt.
- By switching to buying a pair of ankle pants instead of a fourth t-shirt, she maximises her *util* per £ spent.

In fact, her shopping pattern reveals that the first pair of ankle pants has more than 1.5 times the *util* of a fourth t-shirt. Notice that we have just quantified *util*, albeit in a limited way.

Assuming that her shopping at Uniqlo has a budget constraint of £90, she would get the most bang for the buck by purchasing three t-shirts and one pair of ankle pants. The general rule to maximise her *util* is to compare the *util* per £ between the next pair of ankle pants and the next t-shirt. By dividing each product's total *util* by its price she removes the distortion due to the difference in prices; we say that she has unitised the *util* of both goods.

Later we shall see that just like her shopping, equitable wage too is about finding that sweet combination that offers the maximum *util*. And, by the way, with regard to the mathematical equation for equitable wage, the principal variable will be the unitised *util*. So who says we can't write a mathematical equation for something like happiness or satisfaction?

## **Cobb Douglas**

We are close to making acquaintance with equitable wage. But there is still one final piece of the puzzle to put in place. That final piece answers this question — How do we explain output from inputs? Let's think this through step by step.

If a firm produces 10% more output, assuming constant returns to scale, we can reasonably say that the firm has utilised 10% more resources.

What resources does a firm require? Broadly four kinds of resources.

Retailers need merchandise to sell. Manufacturers need materials or components to make products. And all firms also require electricity, auditing services, pencils and myriad other goods and services that don't go directly into the products that they sell. All these, direct as well as indirect goods and services, we call them purchased goods and service.

All firms employ people. We call that resource labour. If to you labour sounds derogatory, you can change that to employees. But whichever, this is the kind of resource that provides labour and skill.

All firms need assets. Office buildings, factories, machineries, computers, cash registers, desks, chairs; these are all assets. The firm has spent money to acquire these assets. We call this kind of resource capital.

Later we will include a fourth kind of resource. No firm exists in a vacuum. A firm conducts its business within the fabric of a society. That society provides the roads,



the railways, the ports, as well as institutions such as the legal system. We call these the social infrastructure, or simply infrastructures. Some societies have sophisticated infrastructures, others primitive. But all societies have infrastructures.

If a firm produces 10% more output, we can reasonably assume that it has utilised 10% more resources. Conversely if a firm increases each resource by 10%, we assume that the firm expects to increase its output by at least 10%. If the firm fails to increase output by 10%, we say that it has become less efficient in converting input to output. If it increases output by more than 10%, we say that it has become more efficient.

So far so good. But what if a firm increases labour by 10% but capital by only 5%? We expected output would increase by somewhere between 5% and 10%. But by how much exactly? Alas, intuition fails us. Fortunately Nobel laureate Robert Solow has come up with the answer.[9] He says that how inputs affect output depends on how good the firm is at switching between resources. We call this ability to switch between resources the elasticity of substitution.

Solow's solution can be applied to any number of inputs. So for example you could use the equation for only labour and capital. Or you could use it for more than four kinds of inputs. For example you could divide labour input into management, technical, supervisory and workers and add to these other inputs such as capital and social infrastructure. The mathematics gets more complicated but the solution can still be had, given sufficient computing capability.

The mathematics used by Solow is quite intimidating, especially if you are not mathematically inclined. But the answer derived through his mathematics is quite instructive. Let's examine that through a chart.

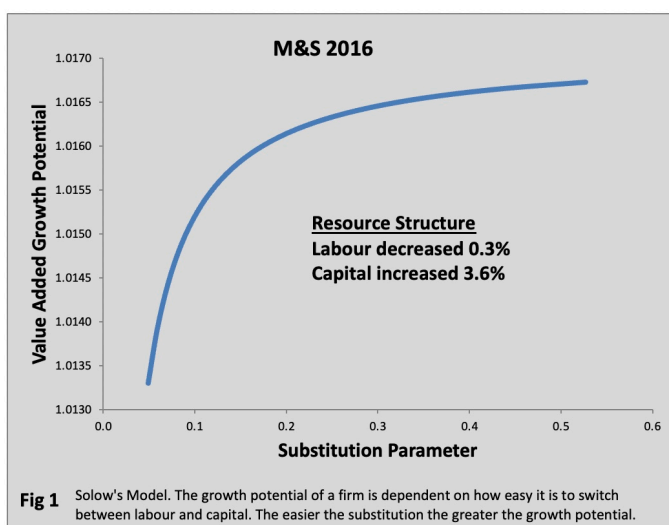


Fig 1 plots the result of applying the Solow equation, using the 2016 financial results of Marks & Spencer.[10] (Later we will examine in greater detail the performance of Marks & Spencer in 2016). Only two kinds of resources, labour

and capital, are considered. In 2016 labour had been reduced by 0.3% whereas capital had been increased by 3.6%.

The horizontal axis of the chart shows the substitution parameter. We won't get into the mathematical details. Suffice to say that the substitution parameter is a measure of Marks & Spencer's ability to switch between resources. By switching between resources Marks & Spencer hopes to get more output out of less input.

Along the vertical axis is the expected extra value added. If you are not familiar with value added, you may just imagine that the vertical axis shows the expected gross income (also known as gross profit). Value added and gross income are closely related measures, although they are not the same.

Bear in mind that the chart is plotted for the actual resource structure (i.e., the actual composition of resources) of 2016. That is, Fig 1 is a chart for a specific resource structure. Notice that for this specific resource structure, the expected gross income depends on the value of the substitution parameter. A firm that is efficient in converting input to output would have a greater substitution parameter. A firm with a greater substitution parameter would achieve a higher gross income for the given resource structure. Conversely, if a firm achieves a high gross income, that is a sure indication that its substitution parameter is high.

The Solow equation is quite complicated; not easy to solve. However, there is a simpler mathematical model, developed by Charles Cobb and Paul Douglas.<sup>[11]</sup> The Cobb Douglas model always yields the same result as the Solow model. That shouldn't surprise anyone. But the Cobb Douglas equation yields only one answer for a given resource structure. In other words, when plotted on a chart, you only get a single point. That is unlike the Solow equation, which gives you a curve, as in Fig 1. You may wonder, what is the relationship between the single Cobb Douglas point and the Solow curve? There are four key relationships.

First, the single Cobb Douglas point always sits on the Solow curve where the substitution parameter equals 1.0.

Second, the first relationship implies that the Cobb Douglas equation tells us what the gross income should be if we varied the composition of the firm's resource structure but kept the firm's efficiency constant.

Third, if the actual gross income falls short of the value predicted by the Cobb Douglas equation, the substitution parameter would be less than 1.0. If the actual gross income exceeds the value predicted, the substitution parameter would be greater than 1.0.

And fourth, if the actual gross income exceeds that predicted by the Cobb Douglas equation it means that the firm has improved on its efficiency in converting its inputs to output.

As we shall see next, solving the Solow equation or the Cobb Douglas equation is the first step in deriving the equitable wage.

## **Marks & Spencer**

Finally we get to our subject of interest — the equitable wage.

We will approach the subject of equitable wage by applying the Cobb Douglas equation.[11] And we will do so with the published financial results of a real company. Actually we will do so with the published financial results of two real companies. But we start with one company, and apply the Cobb Douglas equation to only two resources, labour and capital.

Marks & Spencer turned in a creditable performance in 2016.[10] The company improved on its efficiency in converting input to output. That is, it turned in a gross income greater than that predicted by the Cobb Douglas equation.

The difference between the actual gross income and the supposed gross income — we will call that the gross income surplus, or simply the surplus. (In economics the surplus would be called rent. But in everyday usage rent has an entirely different meaning).

For their contributions to the better performance, both labour and capital were rewarded. Average wage grew from £23,795 to £25,243. Return on capital rose from 23.6% to 24.6%.

So far we can see that Marks & Spencer behaved the way that theories on wage said it would. The question is, should wage have grown more? Should return on capital have risen higher? What is the optimum?

The thing is, employees would always be happy if their wage were larger. And capital providers would always be happy if the return on their investments were higher. But these two desires are irreconcilable. Increasing one necessarily means decreasing the other. So what is the right balance between these conflicting expectations?

Should the company maximise wage or should the company maximise return on capital? Which is the right answer? The answer is, both. The trick is to find that sweet spot where the combined satisfaction of both labour and capital is greatest. This is similar to maximising the *util* between t-shirts and ankle-pants. But whose *util* are we maximising? We are maximising the *util* of the community of stakeholders, of course. The community of stakeholders comprises the company's employees (i.e., labour) and the company's investors and creditors (i.e., capital).

And this is how we go about maximising the *util* of a community of stakeholders. We set up a mathematical expression that reflects the relationship between the surplus and the wage and the return on capital.

We expect that a very small incremental increase in surplus would be accompanied by a small incremental increase in wage. We also expect that a very small incremental increase in surplus would also be accompanied by a small incremental increase in return on capital. What we want to know is this — exactly how large or small are these small incremental increases in wage and return on capital?

How would a mathematician go about finding the answers to these questions? First he searches for a mathematical expression that reflects the relationship between the surplus and the wage and the return on capital. Then to find the answers he would do what the shopper at Uniqlo did. Recall that she valued the second t-shirt less than she valued the first, and the third less than the second. So this was what she did. She unitised the *util* of the next t-shirt and compared that with the unitised *util* for the next pair of ankle pants. Her shopping sweet spot was when the two became equal. The mathematician mimics the shopper's value system. So for example a second £ of wage increase gives the employee a little less pleasure than the first £ of wage increase and the third less than the second and so on.

This is how a mathematician would go about finding the answers. He asks, what would happen to the *util* (i.e., surplus) if the wage were increased by a tiny bit? And what would happen to the *util* if the return on capital rose a tiny bit? The mathematical operation that would give him the answers is called a partial derivative.

So he writes down the unitised partial derivative of gross income surplus with respect to wage. Next he writes down the unitised partial derivative of gross income surplus with respect to return on capital. Then he goes about finding out at exactly what wage and at exactly what return on capital these two partial derivatives become equal. What he is doing mathematically of course is the same as what the shopper did at Uniqlo.

Throughout his mathematical search for the sweet spot where the two partial derivatives meet, the mathematician would keep the gross income surplus constant. That is the same as how the shopper set herself a budget constraint of £90 when deciding between t-shirts and ankle pants.

Let's return to the narrative about Marks & Spencer in 2016. We can take it that the management of Marks & Spencer was highly competent. So it should not surprise us that after all his mathematical juggling, the mathematician's answers for equitable wage and equitable return on capital turn out to be not too different from the actual wage and actual return on capital that Marks & Spencer paid in 2016. Marks & Spencer was paying an equitable wage. Fig 2 summarises the results.

Marks & Spencer		2016
<b>Actual</b>		
Revenue £ million	10,311	10,555
Gross profit £ million	3,986	4,128
Wage £	23,795	25,243
Return on capital	23.6%	24.6%
<b>Cobb Douglas model</b>		
Expected gross profit £ million		4,045
Gross profit surplus £ million		83
<b>Equitable sharing</b>		
Wage £		26,127
Return on capital		23.8%

**Fig 2** Equitable sharing model suggests how the gross profit surplus, derived through the Cobb Douglas model, should be shared.

## **British Airways**

The second example is based on the published 2018 financial results of British Airways.[12] In this second example we expand the company's community of stakeholders to include society. British Airways, like all businesses, doesn't exist in a vacuum. It conducts its business within a society with all the attendant infrastructures, hard and soft. So rightfully we should consider how the company compensates society for the services it receives from the society's infrastructures.

But how do we know how much British Airways compensated society in 2018? And to whom did British Airways pay this return to society anyway?

Here's how and to whom. We take the British government as society's agent. In other words society has appointed the government as its agent to collect taxes and to spend the collected money judiciously on public goods. By taxes, I don't mean just corporate tax. If you examine the government's revenue you would discover that the government in its various guises extracts from businesses a lot more than just corporate tax. Businesses have to pay corporate taxes but they also have to pay payroll taxes and business taxes and excise duties, to name just a few. But that is not all. Businesses also collect taxes on behalf of the government. These include VAT, air passenger and air ticket taxes, and employee's PAYE taxes. Yes, this latter type of taxes also counts as companies' contribution to the government's tax revenues because without the sales revenues that companies generate these tax revenues would not have arisen.

But here's the snag. If you are familiar with reading published corporate annual reports you would know that annual reports generally don't disclose information about all sorts of taxes that companies pay or taxes that they collect on behalf of the government. That, by the way, is why British Airways is chosen for this second example. British Airways is chosen because it participated in an initiative launched

by PricewaterhouseCoopers.[13] Companies that participated in this initiative disclose their total tax contributions, appropriately itemised.

So, just as we would use the total employee costs together with the number of employees to compute the average wage, we can also use the company's total tax contribution to compute the effective rate that the company compensates society. Total tax contribution divided by the company's value added — that would give us a reasonable measurement for the effective rate of return to society.

What about value added? How is it computed? Value added is equal to the revenue less purchased materials and services. But the value of purchased materials and services is not disclosed in the annual report. That's not a problem. Revenue minus purchased materials and services is equal to the company's earnings before employee expenses, interest expenses, corporate tax, depreciation and amortisation.

There is yet another snag. Including society as a stakeholder brings with it another complication. When we vary the ratios of compensations to labour, capital and society, which we must do in the search for the maximum *util*, the company's profit and loss will vary. The value added doesn't change, because value added is simply the company's revenue minus purchased materials and services. But gross income would change because gross income is revenue minus cost of goods sold (usually abbreviated as COGS). That is why it is better that we use value added instead of gross income, when society is included as a stakeholder.

Now, since we are counting society as a stakeholder, the mathematical expression for equitable wage would have to take into account four variables instead of three. The first variable is the value added surplus (remember that we replaced gross income with value added). The second variable is wage. The third is return on capital. And now there is the fourth variable — the return to society.

Except for the fact that there are now four variable, the steps to locate the balance among wage, return on capital and return to society are same as the steps taken for Marks & Spencer. We start by finding the appropriate mathematical relationship among the four variables. Then we work out three partial derivatives. We work out the partial derivative of value added surplus with respect to wage. We work out the partial derivative with respect to return on capital. And we work out the partial derivative with respect to return to society. And finally we search for the sweet spot where the three partial derivatives, for wage, for return on capital and for return to society, are equal or almost equal. That is that spot where the level of satisfaction (or of *util*, if you like) enjoyed by the stakeholders as a whole would be at its maximum.

What answers do we get after we've performed the mathematics? Fig 3 summarises the results. Notice again that, like Marks & Spencer, British Airways managed to set its wage, its return on capital and its return to society pretty close to the sweet spot where the *util* was greatest.

<b>British Airways</b>	<b>2017</b>	<b>2018</b>
<b>Actual</b>		
Revenue incl taxes £ million	13,475	14,267
Value added £ million	6,283	6,519
Wage £	62,966	62,871
Return on capital	23.8%	25.3%
Return to society	12.4%	12.1%
<b>Cobb Douglas model</b>		
Expected value added £ million		6,442
Value added surplus £ million		77
<b>Equitable sharing</b>		
Wage £		64,175
Return on capital		24.8%
Return to society		12.1%
<b>Fig 3</b> Equitable sharing model suggests how the value added surplus, derived through the Cobb Douglas model, should be shared.		

## Equitable Wage Is Old Economics

When is wage equitable? There are five ways I'd answer this.

Wage is equitable when the partial derivative of gross income surplus with respect to wage is the same as the partial derivative of gross income surplus with respect to return on capital and the two are the same as the partial derivative of gross income surplus with respect to return to society.

Wage is equitable when the return to capital and the return to society are also equitable.

Wage will be equitable when hedge funds sing from the same song sheet with Inamori.

Wage will be equitable when management-union relation is no longer acrimonious.

Wage will be equitable when ethics returns to economics.

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