

More exciting than hyper-inflation!!!

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FROM THE NEW EDITOR

It is indeed an honour to succeed Alan King as the editor of *EcoNZ@Otago*. Alan did a superb job and it will be tough following in his footsteps!

Since 1998, *EcoNZ@Otago* has been published twice a year by the Department of Economics at the University of Otago. Authors are members of or visitors to the Department.

The contents of the previous 11 issues are listed at the back of this issue, and single issues are available by emailing us at the address at the top of the page with your request.

In addition, 40 of the best articles have been revised and updated and included in a book to be published by Pearson Education in the middle of this year.

Current issues of *EcoNZ@Otago* will continue to be posted to schools and other groups and individuals and be available from our website address at the top of the page.

If there are any economic issues that you would like examined in a future issue of *EcoNZ@Otago*, then please email us with your suggestions. We can't promise that we will be able to take them all up, but we will do our best.

If you don't have access to email or the internet, you can write to us at: *EcoNZ@Otago*, Department of Economics, University of Otago, PO Box 56, Dunedin.

We hope you enjoy this issue!

Paul Hansen

Lessons for trade liberalisation from the death of Lee Kyung Hae

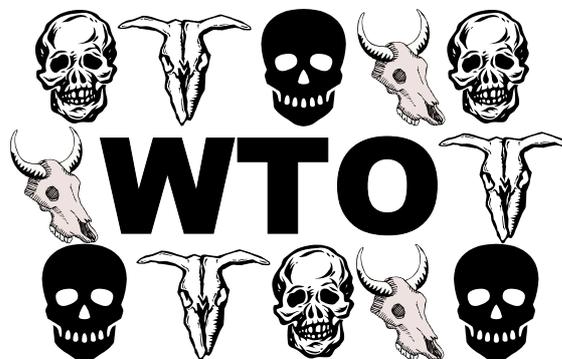
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ON September 10 2003, South Korean national Lee Kyung Hae climbed the barrier that enclosed a convention hall in the Mexican resort town of Cancun. After addressing the crowd he cried, "Don't worry about me, just struggle your hardest", pulled out a Swiss Army knife and stabbed himself in the heart. Mr Lee died several hours later.

Inside the convention hall, delegates representing 146 countries were meeting as part of the midpoint review of the World Trade Organisation's (WTO) Doha round of global trade negotiations. The WTO sets the rules for world trade so that countries can trade as freely as possible, with the overall objective of a more prosperous and peaceful world — in stark contrast to Mr Lee's death. One of the main agenda items at the Cancun meeting was liberalisation of trade in agriculture; it was this that Mr Lee had come to Cancun to oppose.

During his final protest, the 56-year-old farmers' leader — who lost his farm when the Korean government opened its markets to imported Australian beef — wore a placard stating, "The WTO kills farmers". Mr Lee was an innovative and resourceful man who had tirelessly toiled on his land and embraced new technologies in an effort to develop a modern, well-organised farm. Yet he was at loggerheads with the WTO and was prepared to pay the ultimate price for his beliefs.



The World Trade Organisation kills farmers?

In general, why is there such hostility to trade liberalisation? As this article seeks to explain, the answer centres on understanding who the winners and losers from tariff cuts are, and the associated politics of trade liberalisation. We begin, therefore, with a quick refresher course on the main reason why nations trade.

Comparative advantage

New Zealanders drive Japanese cars and Japanese wear clothes made from New Zealand wool. Why? Because New Zealanders and Japanese are better off as a result of being able to trade with each other. In general, international trade makes countries better off than if their borders were closed. This simple fact of life is explained by David Ricardo's theory of comparative advantage (Ricardo 1817).

Central to the theory of comparative advantage is the concept of opportunity cost: the sacrifice of the next best alternative that could have been produced instead of what was made. A country (or an individual) is said to have a comparative advantage in the production of a good if it is able to produce the good at its *lowest* opportunity cost relative to other countries (or individuals). These ideas can be illustrated via the following simple example that is generalisable to countries.

Consider two individuals, Bert and Ernie, who produce and consume two goods, bread and cheese. Bert's and Ernie's production capabilities are summarised in panel (a) of Table 1. As can be seen, it takes Bert 2 hours to produce a loaf of bread and 4 hours to produce a block of cheese, whereas it takes Ernie 1 and 4 hours to produce a loaf of bread and a block of cheese respectively.¹

Thus, in terms of the opportunity costs, Bert must sacrifice $\frac{1}{2}$ a block of cheese to produce 1 loaf of bread (that's how much cheese he could have made instead with the 2 hours spent making the loaf of bread) and 2 loaves of bread per block of cheese (the bread he could have made instead with the 4 hours spent making the block of cheese). Analogously, Ernie must give up $\frac{1}{4}$ a block of cheese to produce 1 loaf of bread and 4 loaves of bread per block of cheese.

Hence, Bert has a comparative advantage in cheese-making (i.e., his opportunity cost per block is 2 loaves compared to Ernie's 4) and Ernie has a comparative advantage in baking (his opportunity cost per loaf is $\frac{1}{4}$ a block compared to Bert's $\frac{1}{2}$). According to the theory of comparative advantage, aggregate production will increase if both individuals specialise in producing the goods in which they have a comparative advantage. So, Bert should increase his cheese-making and Ernie increase his baking.

Gains from trade

Suppose Bert transfers 12 hours of his time from baking to cheese-making (his area of comparative advantage). This will increase his production of cheese by 3 blocks and decrease his production of bread by 6 loaves. Suppose also that Ernie transfers 8 hours from cheese-making to baking (his area of comparative advantage), resulting in 8 additional loaves of bread and 2 fewer blocks of cheese. Aggregate changes in production are displayed in panel (b) of Table 1: bread increases by 2 loaves (8 - 6) and cheese by 1 block (3 - 2).

Clearly, there is potential here for both individuals to gain from trade, as there is more of both goods available to be split between them and neither individual is working more hours. Market

forces will ensure that the rate of exchange of cheese for bread will make both individuals at least as well off as when they produced in isolation of each other and did not trade. For example, Bert could swap his 3 extra blocks for Ernie's 8 extra loaves (i.e., $2\frac{2}{3}$ loaves per block), resulting in 2 more loaves for Bert and 1 more block for Ernie than before they increased production in their areas of comparative advantage.

This simple illustration is easily extended to trade between countries. For example, if Bert were a Japanese producer and Ernie a New Zealander producer, then the above result would still hold: They would both be better off if (Japanese) Bert specialised in cheese-making and (Kiwi) Ernie specialised in baking and they traded. In essence, international trade exists for the same reason that individuals choose not to make all of their own bread or cheese, or graze their own sheep, or produce their own wine, etc. Countries (their citizens) can consume more by concentrating their production in areas in which they have a comparative advantage and trading for goods and services in which they have a comparative disadvantage.

Table 1: Data for the example

	(a) Hours of work per unit of output	
	Bread	Cheese
Bert	2	4
Ernie	1	4
	(b) Changes in output	
	Bread	Cheese
Bert	-6	+3
Ernie	+8	-2
aggregate:	+2	+1

Not everyone's a winner

Given there are mutual benefits from trade, why is international trade liberalisation so controversial? The simple answer is that there are winners and losers from trade liberalisation. That is why Mr Lee zealously opposed the WTO's planned tariff cuts.

Lowering Korean tariffs on agricultural imports, by reducing food prices, would make Korean consumers better off. Korean farmers, however, would be worse off; many would be driven off their land and those that survived would see their profits tumble. The government would also forego tariff revenue.

Nevertheless, free trade is welfare improving *in aggregate*: the gains to consumers outweigh the combined losses to producers and the government, making it *possible* to redistribute income from winners to losers so that everyone is better off.

It might seem, therefore, that because tariff reforms result in widespread gains and isolated losses (and that, in aggregate, the former exceed the latter) free trade would be a natural, and inevitable, outcome in democratic societies. History and a careful analysis, however, reveal that this is not the case.

The problem of collective action

Mancur Olson theorised that political activity on behalf of one group is a *public* good in that all members of the group reap the benefits, not just

¹ This example also debunks the idea that trade disadvantages countries that are technically inefficient. Here Bert is no faster than Ernie at producing both goods and yet, as we shall see, both individuals can gain from trade.

the individuals who lobby the government (Olson 1965).

To understand this, consider the incentives facing the average Korean consumer. Suppose that reducing agricultural tariffs cuts her annual grocery bill by ₩75,000 (about NZ\$100). Provided that she incurs less than ₩75,000 in annual lobbying costs (e.g., writing letters to MPs, attending debates, etc.), she will benefit from tariff reform.

How much effort will an average consumer devote to lobbying? If she is the only individual to petition MPs then her request will be ignored and she will be out-of-pocket by an amount equal to her lobbying costs. If one million consumers express their desire for tariff reforms, the government will be compelled to reduce tariffs. But the influence of one million lobbyists is effectively the same as that of 999,999. Therefore, each individual can decide to be either active (for a gain of ₩75,000 minus her lobbying costs) or passive (for a gain of ₩75,000).

Clearly, being passive is always the better choice for any given individual, regardless of the actions of other consumers. Olson referred to such a situation as the problem of collective action: Although petitioning for tariff reductions is the best strategy for consumers as a whole, each individual has an incentive not to do so.

Korean farmers, on the other hand, are relatively few in number (less than 7.5% of the Korean population). Hence, each individual farmer derives significant gains from agricultural tariffs, which gives each one a greater incentive to lobby against tariff cuts. Korean farmers are also organised into groups² and so it is relatively easy to co-ordinate them to work together.

Therefore, even though agricultural tariffs hurt more voters in aggregate than they help, the incentives facing consumers and producers respectively will uphold the *status quo*: tariffs will remain.

The WTO

As mentioned at the beginning of the article, the WTO sets the rules for world trade with the objective of ensuring countries trade as freely as possible. In principle, the WTO acts in society's best interest *in aggregate*. Because WTO members (146 countries) must abide by WTO guidelines, domestic minority interest groups such as farmers cannot hijack their governments in support of import barriers such as tariffs that favour them at the expense of others.

This is not to say that farmers like Mr Lee should be ignored. There are many justifiable arguments for why groups hurt by tariff reforms should be compensated. In particular, a history of protection from overseas competition has provided incentives for Korean farmers to develop human and physical capital that is specific to farming (and so not easily transferred to other activities). Trade liberalisation will reduce the returns on these investments and force changes in farmers' lifestyles.

Possible forms of compensation include subsidised retraining schemes, redundancy packages, relocation incentives and government purchases of disused capital. These could be funded

² Such as the Korean Advanced Agricultural Federation, of which Lee Kyung Hae was a prominent member.

by a temporary consumption tax on newly-cheap imports.³

In conclusion, tariff reforms improve aggregate welfare but hurt some groups. Interest groups in import-competing industries, whether they are Korean farmers or New Zealand textile workers, are swimming against the tide when asking for continued protection. This is not in the best interests of the majority of a country's citizens and will be quashed once the problem of collective action is overcome. Perhaps a more relevant question is: What should be done to offset the losses to particular groups that arise from trade liberalisation?

Some questions to think about

1. With reference to the example (see panel b of Table 1), what is the range of rates of exchange of cheese for bread that Bert and Ernie could negotiate such they would both be willing to trade?
2. Is it possible that the increase in consumers' real incomes due to tariff cuts — which will increase their demand for most goods, including agricultural goods — will directly offset some of the losses to Korean farmers? Why or why not?

Further reading

Previous issues of *EcoNZ@Otago* have examined different aspects of trade liberalisation and the WTO respectively: Richardson (1998), King (2000) and Wooding (2003). For an account of Lee Kyung Hae's life see Watts (2003).

References

- A. King (2000), *Friendless in Seattle: the WTO and the Millennium Round*, *EcoNZ@Otago* 4: 5-7.
- M. Olson (1965), *The Logic of Collective Action*. Cambridge: Harvard University Press.
- D. Ricardo (1817), *On the Principles of Political Economy and Taxation*. London: John Murray (original publisher). Available from <http://www.econlib.org/library/Ricardo/ricP.html>
- M. Richardson (1998), *A farewell to tariffs: the case for free trade*, *EcoNZ@Otago* 1: 6-7.
- J. Watts. Sept 16 2003. *Field of Tears*. *The Guardian*. Available from www.guardian.co.uk/wto/article/0,2763,1042865,00
- P. Wooding (2003), *The WTO and the Doha Development Agenda*, *EcoNZ@Otago* 10: 10-11.

³ Critics may argue that the distortion created by the consumption tax will exhaust the gains from trade liberalisation. This is not true. A tariff is in every way equivalent to a production subsidy and a consumption tax. Therefore, the proposed solution creates a smaller distortion and, in any case, only requires a temporary intervention.

The relationship between unemployment and inflation: the Phillips Curve

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New Zealander A.W.H. (Bill) Phillips (1914-75) — one-time crocodile hunter, prisoner-of-war, electrical engineer, etc. — was also one of the world's most celebrated economists. He is famous for two things that bear his name: the Phillips Machine and the Phillips Curve.

THE Phillips Machine⁴ is literally a machine (see the photograph below) that Phillips built in 1949 (before electronic computers were available) to represent the Keynesian model of the economy. Standing almost three metres tall, the Phillips Machine has tanks, pipes and pumps and different coloured water representing consumption, investment, exports, etc., to illustrate how economic shocks and fiscal and monetary policies work their way through the economy.

The prototype, which included parts from a World War II bomber, was unveiled in a seminar at the London School of Economics (where Phillips was a student and staff member), and, ultimately, about a dozen Machines were produced and sold around the world in the 1950s (Leeson 1995).⁵ A restored one (the one in the photograph) is now on display at the New Zealand Institute of Economic Research (NZIER) in Wellington.⁶



Man and machine (his portrait is on the right)

Phillips is even more famous for his discovery of the so-called 'Phillips Curve': an inverse relationship between unemployment and inflation (see the 'C'-shaped curves in Figure 1 and 2 below) (Phillips 1958).

The Phillips Curve led policy makers around the world in the 1960s to believe they could use fiscal and monetary policies to target particular combinations of unemployment and inflation. In effect, they thought that they could choose where on the Phillips Curve they wanted their economies to be. They could reduce unemployment if they were prepared to tolerate more inflation, and they could reduce inflation if they were prepared to tolerate more unemployment.

However, subsequent empirical research challenged the existence of a stable relationship between the two variables. Expansionary fiscal and monetary policies⁷ during the 1950s and 1960s met with higher inflation but unemployment did not fall permanently as the Phillips Curve predicted. Instead, unemployment returned to its 'natural rate'⁸ and inflation stayed at its higher rate.

It seemed that when policy makers tried to exploit the Phillips Curve — by choosing where on it they wanted their economies to be — something changed in the relationship between unemployment and inflation. What was going on here?

A theoretical refinement

Milton Friedman came up with a compelling explanation for why any attempt to use expansionary fiscal or monetary policies, and the resulting higher inflation, to reduce unemployment below its natural rate would only be temporary (i.e., in the *short run*) rather than permanent (in the *long run*) (Friedman 1968). Central to Friedman's theory — known as the '*expectations-augmented Phillips Curve*' — is the notion that employers' and workers' expectations of future inflation affect their wage negotiations (which determines unemployment).

In the *short run*, employers will be prepared to offer higher wage rates to attract more workers because they expect, as a result of the inflation generated by the expansionary fiscal or monetary policies, higher prices in the future for the goods they produce and sell. However, the only reason that workers who would otherwise be unemployed would accept the employers' higher wage offers is if they did

⁴ Also known as the 'the Moniac' (Money Machine) and 'the Financephalograph'.

⁵ Mainly to universities but also to the Ford Motor Company and the Central Bank of Guatemala.

⁶ To arrange a visit to the NZIER to see the Phillips Machine in action, contact John Ballingall on (04) 470 1813 or john.ballingall@nzier.org.nz. Thanks to John and NZIER for the photograph.

⁷ Expansionary fiscal policy refers to an increase in government spending or a tax cut. Expansionary monetary policy usually manifests as a decrease in interest rates.

⁸ The natural rate of unemployment is the rate of unemployment to which the economy tends in the long run, as determined by the fundamentals of the labour market: labour demand (e.g., labour productivity) and labour supply (e.g., workers' willingness to work).

not expect that inflation was going to rise. Only by 'fooling' the workers in this way is it possible for unemployment to fall (in the short run).

Of course, you can't fool all of the workers all of the time! In the *long run*, when inflation does in fact rise (as it inevitably will), they will come to realise they are actually no better off (in purchasing power terms). Therefore, when it comes time for them to renegotiate their wages, they will demand even higher wages in line with the higher-than-expected inflation that materialised. How will employers respond to these higher wage demands? They will lay off or not rehire some of their workers and employment will fall. Thus, in the *long run*, inflation will have risen, as will have worker's expectations of inflation, but unemployment will be back at its natural rate.

In summary, Friedman argued that the inverse relationship between inflation and unemployment exists only in the short run, and only for a given level of expected inflation by workers. Policies that led to higher inflation cause workers to adjust their expectations of inflation upwards, causing the 'expectations-augmented Phillips Curve' to move upwards, leading to a wage and price spiral. Thus, as represented in Figure 1, in the long run the Phillips Curve (i.e., 'the long-run Phillips Curve', LRPC) is vertical at the natural rate of unemployment.

The process described above can be illustrated using Figure 1. Starting from point A where unemployment is at its long-run natural rate and actual inflation is equal to expected inflation at 2%, expansionary fiscal or monetary policy

reduces unemployment temporarily as inflation moves ahead of worker's expectations (2%) and the economy moves along the Phillips Curve labelled $PC\pi^e = 2\%$ to point B where inflation is at, say, 8%.

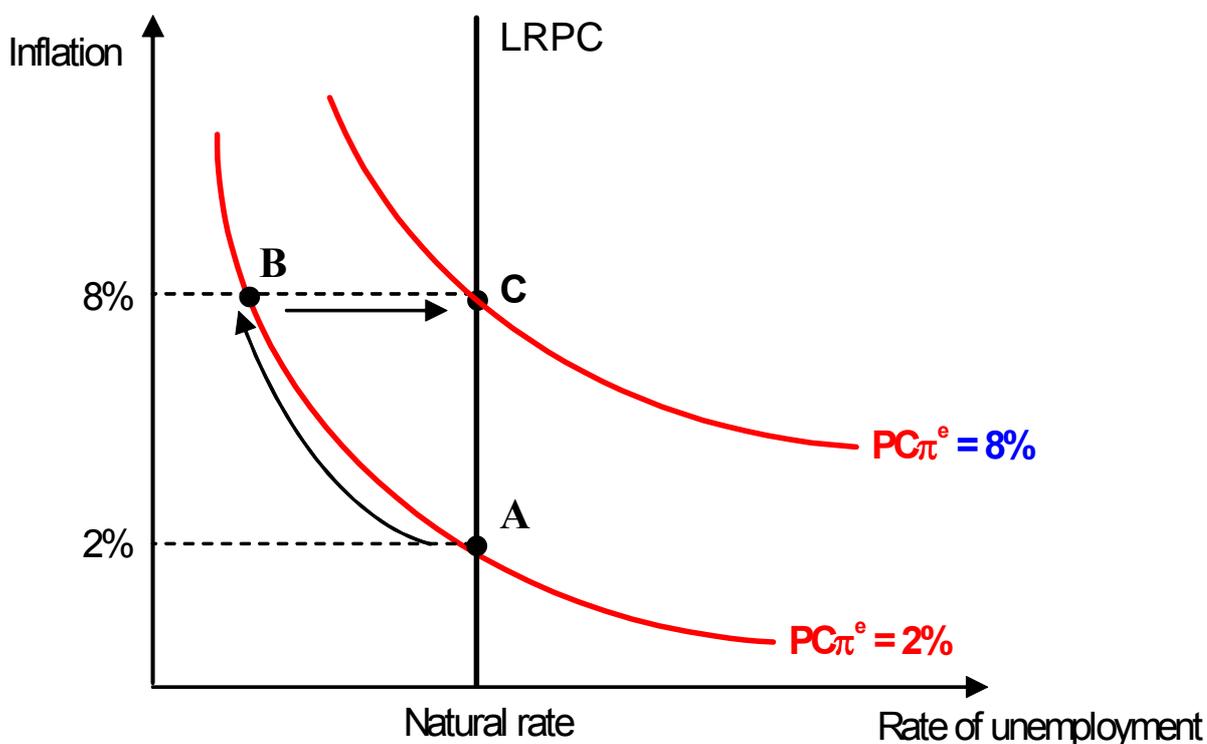
As explained above, workers eventually realise that inflation has eroded the purchasing power of their wages and they renegotiate higher wages commensurate with the 8% inflation they are now experiencing. Firms reduce their employment back to the original level and the economy moves back to the natural rate of unemployment but on a higher Phillips Curve ($PC\pi^e = 8\%$) where workers' expectations of inflation have risen to actual inflation. Further expansionary policy to reduce unemployment below the natural rate will further exacerbate inflationary expectations and the economy will gradually move up the long-run Phillips Curve (LRPC) on progressively higher and higher short-run Phillips Curves, thereby entrenching a wage and price spiral.

Recent evidence for New Zealand: A tale of two curves

What has been the experience of the New Zealand economy over the last 18 years? Only since 1985 has a consistent unemployment series been available, from when Statistics New Zealand introduced the Household Labour Force Survey (HLFS).

Figure 2 (over the page) is a graph of the rates of unemployment and inflation for 1985–2003. From a crude 'eye-balling' of the plotted data, a *single* short-run Phillips Curve appears to stand out at first glance. On closer inspection, however, it is possible to discern *two* short-run Phillips Curves (as sketched).

Figure 1: Two short-run Phillips Curves and a long-run Phillips Curve (LRPC)



The higher short-run curve corresponds to people's expectations of inflation being relatively high for the period 1986–92 — at about, say, 8%. During this period, people were locked into a wage negotiating 'mind-set' that they had developed in the 1970s when inflation had been high. This expectation of at least 8% inflation had persisted despite successive governments' stated aims to reduce inflation. Only with the experience of a deep recession (during 1988–93) and a credible commitment by the government did workers finally reduce their inflationary expectations in line with the Reserve Bank's well-known targeting of around 2% inflation.

The lower short-run Phillips Curve in Figure 2 corresponds to people's expectations of inflation being relatively low for 1993–2003 — at about, say, 2%. From 1993 onwards — after the introduction of the 1989 Reserve Bank Act (that initially mandated inflation to 0–2%) and Ruth Richardson's 'Mother of all budgets' welfare cuts in 1991, and several years of high unemployment and low inflation — people started to believe that policy makers really were committed to low inflation and they adjusted their expectations of inflation downwards accordingly.

In summary, the painful disinflationary period of the late 1980s and early 1990s is clearly mapped out by the data in Figure 2 as New Zealand moved right and down the $PC\pi^e = 8\%$ short-run Phillips Curve, and then to the $PC\pi^e = 2\%$ curve once high inflationary expectations had been beaten out of New Zealanders' psyches.

Finally, consistent with standard practice, the long-run Phillips Curve (LRPC) in Figure 2 is

positioned at the 5.5% rate of unemployment. Although there are no formal procedures for accurately determining the natural rate of unemployment, and there are good reasons to expect that it changes over time, this is as good a guess as any — for the simple reason that it intersects the higher short-run Phillips Curve ($PC\pi^e = 8\%$) at close to the 8% inflation rate and the lower one ($PC\pi^e = 2\%$) at the 2% rate.

Some questions to think about

1. Why does a movement upward along the short-run Phillips Curve imply a declining real wage for workers?
2. How would the short-run Phillips Curve eventually adjust to changes in workers' perceptions about their real wages?
3. Why is the natural rate of unemployment unrelated to the inflation rate?

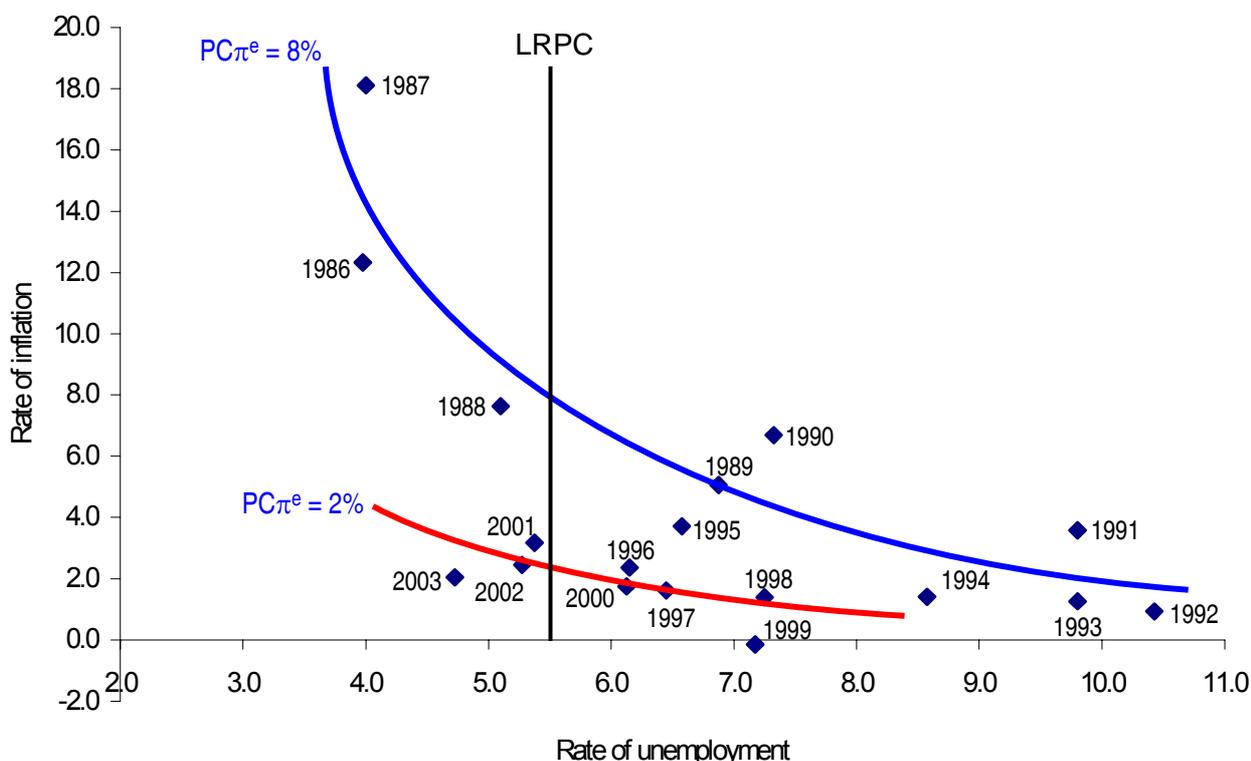
Further reading

For more information about Bill Phillips the man, and his machine and curve see Leeson (1995).

References

- M. Friedman (1968). The role of monetary policy. *American Economic Review* 68: 1-17.
- R. Leeson (1995). A.W.H. Phillips: His machine and his curve. *New Zealand Economic Papers* 29: 231-243.
- A.W. Phillips (1958). The relationship between unemployment and the rate of change of money wage rates in the United Kingdom, 1861-1957. *Economica* 25: 283-299.

Figure 2: New Zealand's Phillips' Curves, 1986-2003



Fun-loving – and *rational?* – criminals: The economic theory of crime and punishment

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“Lock ‘em up and throw away the key!” is an oft-heard cry nowadays, as more and more people despair at the number of serious crimes committed in New Zealand.

AS Figure 1 shows, reported crime rates (the number of crimes divided by the New Zealand population) for the six major crime categories considered have generally increased over the last 40 years. Some commentators argue that too few front-line police and lenient sentencing and lax parole supervision are responsible, at least in part.⁹ Lobby group the Sensible Sentencing Trust, for example, argues:

If our criminals and potential criminals knew that they would be dealt with, *swiftly*, with *certainty* and *severity*, and those that cannot be deterred are detained to prevent them from reoffending, our crime rates would drastically reduce. (2004, home page, their emphasis).

This quotation embodies the popular belief that punishment has a *deterrence* effect (as well as an obvious *incapacitation* effect)¹⁰ with respect to *preventing* crime and that that is one of the main functions of punishment.

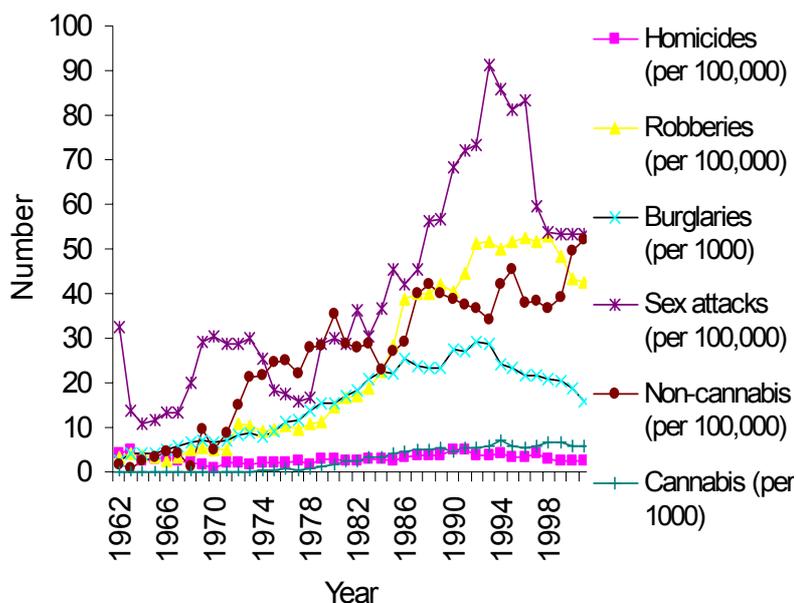
In contrast, traditional theories of crime and punishment focus on morality, justice and retribution. In essence: criminal acts are wrong; therefore guilty people should be punished; and the severity of the punishment should reflect the seriousness of the crime. That almost 92% of voters in a 1999 referendum supported the proposition that, among other things, “minimum sentences and hard labour for all serious violent offences” should be imposed, suggests there is wide-spread support for tougher sentencing in general.

The deterrence effect is central to the economic theory of crime and punishment that originated with Gary Becker (1968), the winner of the 1992 Nobel Prize in Economics. As explained below, this theory seeks to predict the behaviour of criminals and therefore offers insights into how crime might be reduced.

⁹ Criminologists have considered a range of other factors including unemployment and poverty, social alienation, the education system, dysfunctional families, drug abuse, TV violence, and demographic characteristics, such as population density and sex, age and ethnic composition, etc. Some of these can be incorporated into the economic theory of crime and punishment discussed below.

¹⁰ When a criminal is locked up (incapacitated), she is less of a danger to the rest of society. She may be to other criminals and prison staff, but not to people on the outside (though, some members of organised crime may still manage to direct their criminal empires from behind bars).

Figure 1: Selected crime rates for New Zealand, 1962–2001



The economic theory of crime and punishment

At the heart of this theory — like most economic theories of behaviour — is the assumption that most people, including criminals and potential criminals, are mostly *rational* and that they therefore respond to incentives. Accordingly, when a person commits a crime, she is making a rational choice. Like all rational choices, this one involves a comparison of the expected costs and expected benefits to her of alternative actions, such as to steal or not to steal, or to hurt someone or not, etc. The alternative chosen is the one that she expects will make her better off.

What are the expected costs and benefits of crime to the individual? The benefits are the proceeds from the crime, such as (stolen) money or goods, or in the case of violent crimes, some kind of ‘satisfaction’. As there is always a risk to the criminal of getting caught and therefore not securing these proceeds, they must be weighted by the probability of not getting caught, to obtain the *expected* benefits.

The *expected* costs of crime to the individual are the probability of being caught and punished multiplied by the opportunity costs to the criminal of the punishment itself. As well as monetary costs (if the punishment is a fine) and/or time costs (if it is imprisonment), these costs include emotional ones such as shame and humiliation from being punished.

Which 'branch' do you choose?

This cost-benefit analysis framework is represented in the 'tree diagram' in Figure 2 below. At the first 'fork' in the tree — labelled "Choose" — the individual must decide which 'branch' to travel down: to commit a particular crime (e.g., steal), or not.

If she commits the crime, then one of two things will happen: either she gets caught (with probability p_{caught}) or, alternatively, she gets away with it and enjoys the proceeds of her crime (with probability $1 - p_{caught}$). If she gets caught, then either she is convicted (with probability $p_{convicted}$) or she is acquitted and her life continues more-or-less as before. If she is convicted, then she incurs the monetary/time/emotional costs of being punished, as discussed earlier.

Thus, by following along the branches it is easy to see that the *expected benefits* of the crime are:

$$(1 - p_{caught}) \times \text{'proceeds of crime'} + p_{caught} \times (1 - p_{convicted}) \times \text{'proceeds of crime'}$$

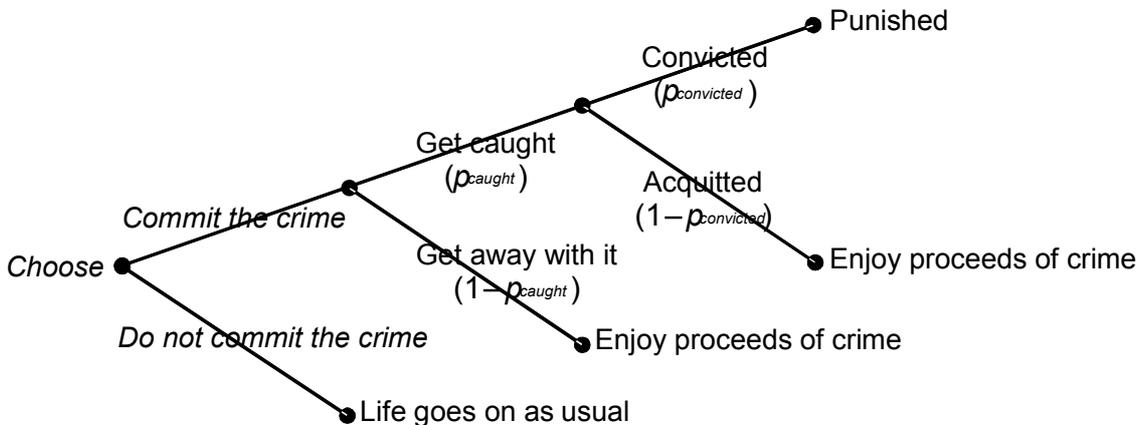
And the *expected costs* are:

$$p_{caught} \times p_{convicted} \times \text{'punishment costs'}^{11}$$

The individual compares the difference between these expected benefits and expected costs (the *net* expected benefits of committing the crime) with the net benefits of not committing the crime. Depending how she feels about taking risks, she chooses the alternative (branch) she prefers. Only if the crime 'pays' in this sense will she choose to commit it.

The extent to which crime pays varies for different individuals. As Becker (1968, p. 176) puts it, "Some people become criminals not because their basic motivation differs from that of other people, but because their benefits and costs differ." In particular, when a person is locked-up, part of her opportunity cost is forgoing whatever else she would have been doing instead with her time and

Figure 2: Tree diagram for the decision to commit a crime



¹¹ Whether she is convicted or acquitted, she will probably also incur the costs of mounting a legal defence. For simplicity, these costs are not included here.

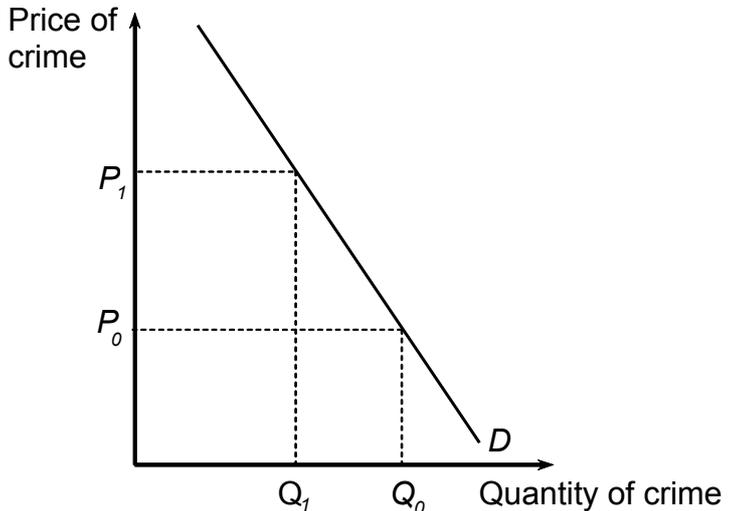
liberty. Therefore, people's time costs of punishment depend on whether they are employed or unemployed and, if they have a job, how well they are paid (which depends, in part, on their education). In general, the more that a person has to lose by going to jail, the less willing she will be to risk that outcome by committing a crime.

A downward-sloping demand curve for crime

Clearly, this framework predicts that increasing the probabilities of being caught and convicted respectively (p_{caught} and $p_{convicted}$), and the costs to the criminal of being punished, will reduce people's willingness to commit crimes (all other things being equal).

This is equivalent to the usual Law of Demand, such that it is sometimes referred to as the Law of Deterrence (Cooter & Ulen 2000, p. 460): As the expected costs ('the price') of crime rise, less crime is committed ('the quantity demanded falls'). Figure 3 below is a stylised representation of an aggregate¹² 'demand curve for crime'.

Figure 3: A demand curve for crime



¹² An aggregate demand curve is simply the horizontal sum of all individuals' demand curves.

Policy implications

The economic theory of crime and punishment has the following implications for public policy. An increase in the number of front-line police that increases p_{caught} will increase the price of crime (e.g., from P_0 to P_1 in Figure 3), which, if this change is understood by criminals and potential criminals, will reduce the quantity of crimes committed (e.g., from Q_0 to Q_1).

Similarly, an increase in the effectiveness of the criminal justice system so that more criminals are convicted ($p_{convicted}$) will also increase the price of crime and reduce the quantity committed.

Finally, an increase in the severity of punishment — i.e., larger fines and/or longer sentences and/or harsher prison conditions and/or stricter paroles — will also raise the price of crime and reduce the quantity committed, as (less obviously) will an increase in employment and wage rates.

The ultimate issue, therefore, is the extent to which these price increases translate into reductions in crime. In other words, what is the price elasticity of demand for crime? This is a controversial area of empirical research, as it depends on the type of crime (e.g., murder versus traffic offences) and the other determinants of crime in general (see footnote 1). Nonetheless, a number of overseas studies (e.g., Ehrlich 1975 and Bodman & Maultby 1997) have found evidence of negative elasticities, and hence it may be concluded that punishment has a deterrence effect in general, as most people would expect.

Some questions to think about

1. As explained above, the economic theory of crime and punishment relies on "most people, including criminals and potential criminals, [being] mostly rational". This does not mean that they know all the costs and benefits and their risks perfectly, but it does require that they appreciate them, at least approximately.
 - (a) Suggest examples of situations in which people are likely to be *irrational* when they make the decision to commit a crime or not.
 - (b) In such situations, what does this imply for the deterrence effect of punishment?
2. Can you see why, as asserted above, an increase in employment and wage rates would be expected to increase the price of crime and, therefore, reduce crime rates (i.e., move up along the demand curve for crime)?
3. The policy implications discussed above all involve movements *along* the demand for crime curve (as the price of crime changes). 'Ordinary' demand curves *shift* (to the left or right) when factors other than price change — e.g., tastes, or the price of complements or substitutes. In the context of the demand for crime, what would such shifts of the demand curve represent?

4. Some cities such as New York have a policing policy of 'zero tolerance on crime' (also known as a 'broken windows' policy) where people are punished for even relatively minor crimes, like littering. How might this serve to reduce more serious crimes, like murder?
5. China and the USA both have capital punishment for serious crimes such as murder. What are the pros and cons of such a severe punishment?

Further reading

An accessible textbook on the general subject of Law and Economics is Cooter & Ulen (2000), which includes the chapter, "An Economic Theory of Crime and Punishment".

References

- G. Becker (1968), Crime and punishment: An economics approach. *Journal of Political Economy* 76: 169-217.
- P.M. Bodman & C. Maultby (1997), Crime, punishment and deterrence in Australia: A further empirical investigation. *International Journal of Social Economics* 24: 884-901.
- R. Cooter & T. Ulen (2000), *Law and Economics*, Addison Wesley.
- I. Ehrlich (1975), The deterrent effect of capital punishment — a question of life and death. *American Economic Review* 65: 397-417.
- Sensible Sentencing Trust (2004). Website at <http://www.safe-nz.org.nz>.
- D. Trendle (2003), Which incentives deter crooks? An empirical investigation into the determinants of selected New Zealand crimes. Honours dissertation, Department of Economics, University of Otago.

The long and the short of futures contracts (as used by George Soros to break the Bank of England!)

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On September 22 1992, George Soros became famous when he 'broke' Britain's central bank, the Bank of England (BBC News 1998). He did this by 'short-selling' a huge quantity of pounds sterling, in the process netting more than US\$1 billion profit for himself.

AT THE same time, 20,000 km away in New Zealand, a farmer bought a tractor with the proceeds from 'forward-selling' 10,000 kg of wool that he had yet to grow from lambs that were just being born.

What did Mr Soros and the farmer have in common? They were both able to sell something (pounds or wool) that neither of them possessed but that they promised to deliver at a specified future date and price. They were able to do this because of the existence of financial instruments known as futures contracts (or 'futures' for short). This article seeks to explain their key features.

Hedging your bets

If you were the above-mentioned farmer and you wanted to guarantee the price you received for your wool that would be ready in nine months, you could forward-sell it by entering into a futures contract. This is an agreement to deliver a specified quantity of a commodity at a specified price on a specified date — e.g., 10,000 kg of 20 micron wool at \$10 per kg, to be delivered on July 1.

By locking in the specified price, a futures contract eliminates the risk that you will receive a lower price for your wool if instead you waited the nine months and sold it then on the 'spot' market.¹³ By eliminating this risk — and, of course, the 'up-side' risk of a higher price — you are doing what is known as 'hedging' your risks.

The futures contract is not without risk itself, however. If you over-estimated the amount of wool you thought you could produce to complete the contract you would still have to buy the difference on the spot market in nine months. If the shortfall was due, say, to a severe snowstorm that hit your farm and other wool producers then you could miss out in two ways.

First, the decrease in the market supply of wool would cause its price to rise, but you would be stuck selling your wool at the lower contract price. Second, you would have to buy this more expensive wool on the spot market and sell it for the cheaper contract price. The first loss is a lost opportunity to gain on the upswing of prices and the second loss is a straight monetary one.

So, as a farmer, if you were using futures as your hedging instrument, then you would be advised not to fully hedge all your wool but only the amount that you needed (e.g., to purchase a tractor), leaving the balance unhedged so that you could safeguard against unexpected shortfalls in

production or take advantage of (i.e., speculate on) any price upswings.

Selling yourself short

Another way you as a farmer can use futures is if you have superior knowledge of the wool market relative to other participants. Suppose that, contrary to popular wisdom, you expected the market would be flooded with wool in nine months and that prices would fall. Here is a good opportunity for you to make some money. How can you make money if something you produce is going to fall in price? Simple, do like George Soros did with the pound sterling and short-sell wool!

This involves entering into a contract to supply *more* wool than you will have in nine months. When the delivery date comes around and you have to supply the wool, simply purchase the extra wool at the cheaper price (remember, you expected the price to fall!) and use that wool to fulfil your contract.

By short-selling in this way you were able to sell something you didn't own and make a tidy profit doing so. In essence, instead of buying low and then selling high (the usual way to make a profit), you sold high and then bought low! Of course, if you had got it wrong and the price had risen rather than fallen then you would have made a loss, as you would have had to pay more for the wool that you needed to complete the contract than you had short-sold it for.

Speculating on an over-valued currency

George Soros used essentially the same process to break the Bank of England in 1992. He short-sold the pound sterling because he considered it to be over-valued and, therefore, he expected the Bank to devalue it in the future. In effect, he pre-sold billions of pounds at a high price relative to what he had to pay for them later after they had been devalued when he had to deliver them to the buyers.

To understand how he did this it is important to appreciate that at the time the pound was fixed in value against a basket (or group) of the currencies of Britain's main trading partners.¹⁴ This means that although the pound's performance in currency markets was still determined by the usual demand and supply factors, the Bank of England had to 'mop up' any excess supply of pounds at its fixed price by buying them with other currencies (otherwise the pound would depreciate, which was not permitted). Similarly, but far less often in practice, when there was excess demand for pounds the Bank had to sell them in exchange for other currencies (otherwise the pound would appreciate).

Now, if a speculator like George Soros thinks that a currency is fixed at too high a value — in other words,

¹³ The spot market is the market that exists for goods traded at that point in time (compared to the futures market, for goods to be traded in the future).

¹⁴ Indeed, Mr Soros's actions were responsible, at least in part, for the pound being floated.

it is over-valued¹⁵ — he can attack the currency by short-selling it. Soros short-sold many billions of pounds at its existing (over-valued) price and promised to deliver them at a specified future date. By then he expected that the Bank would have devalued the pound, thereby enabling him to buy them at a lower price than that at which he sold them, thereby ensuring a profit for himself.

What made him expect that the Bank would oblige him by devaluing the pound? The fact that the pound was already over-valued meant that to continue supporting it the Bank was having to borrow increasing amounts of other currencies. Presumably, that could not go on forever.

More importantly, however, Soros realised that when he eventually repaid the billions of pounds he had effectively borrowed (by short-selling them) this would flood financial markets with pounds, many of which would be used to buy other (under-valued) currencies, causing a 'run' on the pound. Soros expected that the Bank, in anticipation of this imminent threat, would have no choice but to devalue the pound before then.

This is in fact what happened. Soros then sprung his trap by buying the now cheaper pounds and using them to complete his contracts by delivering the pounds to the buyers he had the contracts with. The difference between what he sold the pounds for and what he later paid for them was more than \$US1 billion — his profit.¹⁶ (Of course, this profit would have evaporated if the Bank had not devalued.)

The mechanics of futures

Beginning in the 19th Century, and in some cases even earlier, futures contracts are now available for a wide variety of agricultural produce such as 'pork bellies', live cattle, grains and timber (and wool). Futures enable producers and buyers of these commodities to reduce the inherently large risks associated with growing plants and animals. Futures are also widely used for financial assets (also risky), such as share market indices (and currencies), and even the weather!

In reality, most futures contracts (including short-selling) are not settled with the actual delivery of the commodity specified in the contract. To see how futures work in practice, let's return to the earlier example of the farmer who wants to forward-sell his wool. Imagine, also, that there is a carpet maker who wants to forward-buy wool (to make carpets) so as to lock-in a specified quantity of wool at a specified price to be delivered on a specified date.

A futures broker would set each of them up with a futures contract for, say (as in the earlier example), 10,000 kg of wool at a price of \$10 per kg for July 1. The farmer takes what is known as the 'short' position in his contract— he agrees to deliver the wool — whereas the carpet maker takes

the 'long' position — she agrees to receive the wool.

For each position, short and long, a daily profit or loss is calculated that depends on daily changes in the futures price of the commodity. Suppose that on the day after the farmer and carpet maker entered into their contracts at \$10 per kg, the futures price for wool (still for delivery/receipt on July 1) increased to \$11 per kg.

As a result, the farmer, in the short position, has effectively lost \$1 per kg because the \$10 per kg he is obliged to accept for his wool is less than the \$11 that other farmers will receive in the future. The carpet maker, in the long position, has profited by \$1 per kg because the \$10 per kg he is obliged to pay is less than the \$11 per kg that other buyers will pay in the future. Accordingly, on the day after they entered into their contracts, the farmer's account will show a \$10,000 loss (\$1 per kg × 10,000 kg) and the carpet maker's account a \$10,000 profit.

Similar adjustments are made every day to both positions' accounts as the futures price for wool changes, until the day that the contract expires¹⁷ (July 1, in this example). Thus, suppose the sequence of daily futures prices were: \$11 (as above), then \$9 the next day, then \$10, then \$13 ... etc. ... and then \$12 on the final day of the contract. The farmer's account would progress thus: a \$10,000 loss, then a \$10,000 profit (in total), then no profit or loss, then a \$30,000 loss ... etc. ... and, ultimately, a \$20,000 loss (in total). The carpet maker's account would mirror this except the losses would be profits and vice versa.

To summarise: when the contract (10,000 kg of wool at a price of \$10 per kg) was settled on July 1 at \$12 per kg, the farmer would have lost \$20,000 on his contract and the carpet maker would have made \$20,000 on hers. That would be the end of the story, but for the fact that the farmer still wants to sell his wool and the carpet maker still wants to buy wool. We will return to this in a moment.

But first, let's think of these two individuals as speculators instead (like George Soros) — speculating, via their short and long positions respectively, on whether the futures price of wool would rise or fall relative to the price (\$10) that they bought their futures contracts at. In this respect, therefore, a futures position (short or long) is really a financial asset that can make or lose money for a speculator. In the example above, the 'short' speculator lost \$20,000, whereas the 'long' speculator made that amount.

Now let's return to the story of the farmer (the short position) and the carpet maker (the long position). Despite his \$20,000 loss, the farmer still wants to sell his wool. Likewise, despite her \$20,000 profit, the carpet maker still wants to buy wool. What is the final result?

On July 1, the farmer sells his 10,000 kg of wool for \$12 per kg (the spot market price for wool)¹⁸, thereby earning himself \$120,000. Remember, though, that he lost \$20,000 on his futures contract. So, in fact, he made only \$100,000 from selling his 10,000 kg of wool — equivalent to the \$10 per kg that was guaranteed in

¹⁵ As evidenced, for example, by persistent balance of payments deficits.

¹⁶ Soros did not stop there. Malaysian Prime Minister Mahathir accused him of bringing down the Malaysian currency, the ringgit, in 1997 in similar circumstances. Soros has also made some spectacular losses in other currency and financial deals (BBC News 1998).

¹⁷ Alternatively either party may decide to 'close out' their position before the contract expires, which means that they quit and accept whatever profit or loss they have made at that time.

¹⁸ Equal to the futures price on the last day of the contract (July 1).

his futures contract. Likewise, the carpet maker buys 10,000 kg of wool for \$12 per kg, for a total cost of \$120,000. But once her \$20,000 profit from her futures contract is included, the 10,000 kg of wool actually cost her only \$100,000 — also equivalent to the \$10 per kg locked-in by her futures contract. By using futures, both the farmer and the carpet maker have successfully hedged themselves.

Some questions to think about

1. What role do futures markets, in general, play in the functioning of an economy?
2. Why are futures contracts available for commodities that are inherently risky, like agricultural produce and financial assets?
3. Is what George Soros and other currency speculators do fair?

Further reading

The Economist magazine ran a series of eight articles in 1999 about various aspects of finance, including one (the sixth) on derivatives, including futures contracts (*The Economist* 1999). A textbook on the subject is Hull (1999). Finally, an interesting article about currency speculators such as George Soros is *The Economist* (1997).

References

- BBC News (author unknown). The man who broke the bank of England. BBC News website, available from http://news.bbc.co.uk/1/hi/business/the_economy/229012.stm.
- The Economist* (author unknown). November 27 1999. Future perfect. pp. 89-90.
- The Economist* (author unknown). September 25 1997. Mahathir, Soros and the currency markets.
- J.C. Hull (2002). *Options, futures, and other derivatives*. Prentice Hall.

Commentary on the New Zealand economy

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In late 2003 there was considerable speculation in financial markets as to when the Reserve Bank (RBNZ) would raise the official cash rate (OCR). (The answer, as it turned out, was 29 January.)

YET A glance at the table below might lead one to question why interest rates need to rise at all. Food and Producer Price inflation are both around zero and Consumer Price inflation has been falling in recent quarters to near the bottom of the official target band of 1-3%. With inflationary pressures this low, shouldn't the RBNZ be lowering rates, not raising them?

The reason for the speculation is that there are pressures on the inflation rate out there, but they are being obscured by other offsetting factors. These are holding the overall rate of inflation down at the moment, but are unlikely to do so indefinitely.

The key factor keeping the lid on inflation recently is the dollar's steady appreciation over the last two years. This has contributed to the fall in the prices of exports and imports. (This can be seen from the fact that, despite rises in the volume of goods exported and imported, the value of both have either stayed the same or fallen – hence, their prices must have fallen.) Cheaper exports and imports (collectively referred to as *traded goods*) helps to keep inflation low generally – but only for

as long as the dollar keeps gaining strength. When it stabilises, or worse starts to fall, this constraint on inflation is removed. As the dollar is somewhat over-valued at the moment, this is likely to occur sooner rather than later. When it does, other pressures on inflation will then come to the fore.

A leading contender in this regard is the *nontradables* sector (i.e., the part of the economy that produces goods and services that typically are not traded internationally). In spite of the strong dollar holding some costs of production down, the prices of nontradable goods inflated at over 4% in the year to September – its fastest rate since December 1996. Driving this is the buoyancy of the New Zealand economy and the recent high level of immigration that has created a building boom and pushed construction costs up by almost 7% in the last year.

New Zealand's unemployment rate (a 16-year low) is just starting to add to the RBNZ's woes. The proportion of workers achieving pay increases of over 3% each quarter is currently the highest it has been in over a decade. If productivity hasn't also risen, this places further pressure on inflation and on the RBNZ to lift interest rates.

	Quarter				
	Sep 2003	Jun 2003	Mar 2003	Dec 2002	Sep 2002
GDP (real, annual growth rate, %)	3.8	4.2	4.5	4.4	4.0
Consumption (real, annual growth rate, %)	4.5	4.0	4.0	4.0	3.9
Investment (real, annual growth rate, %)	8.6	9.4	7.1	9.1	11.7
Employment: full-time (000s)	1502	1481	1467	1461	1451
Employment: part-time (000s)	438	431	429	425	428
Unemployment (% of labour force)	4.4	4.7	4.9	4.9	5.4
Consumer Price Inflation (annual rate, %)	1.5	1.5	2.5	2.7	2.6
Food Price Inflation (annual rate, %)	0.3	0.0	-0.2	0.9	2.3
Producer Price Inflation (outputs, annual rate, %)	0.7	-0.6	-0.4	-0.1	-0.1
Producer Price Inflation (inputs, annual rate, %)	0.1	-1.9	-1.3	-1.4	-2.1
Salary and Wage Rates (annual growth rate, %)	2.3	2.3	2.3	2.1	2.3
Narrow Money Supply (M1, annual growth rate, %)	6.8	2.3	2.3	5.2	7.4
Broad Money Supply (M3, annual growth rate, %)	4.8	4.1	6.0	11.5	4.9
Interest rates (90-day bank bills, %)	5.15	5.23	5.81	5.92	5.86
Exchange rate (TWI, June 1979 = 100)	62.2	61.4	60.9	57.7	53.8
Exports (fob, \$m, year to date)	28,728	29,291	30,271	31,034	31,682
Imports (cif, \$m, year to date)	31,942	32,161	32,168	32,337	32,163
Exports (volume, June 2002 [not seas. adj.] = 1000)	937	928	959	944	932
Imports (volume, June 2002 [not seas. adj.] = 1000)	1202	1187	1127	1119	1092
Terms of Trade (June 2002 = 1000)	1004	1007	996	971	982
Current Account Balance (% of GDP, year to date)	-4.6	-4.5	-3.9	-3.7	-3.5

Sources: Statistics New Zealand (www.stats.govt.nz), Reserve Bank of New Zealand (www.rbnz.govt.nz).

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