

# Technical Note on the Basis of Assumptions Regarding the Effect of the Tax Package on Forecast and Projected Economic Growth

Prepared by the Treasury

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## Summary

The economic forecasts and projections in Budget 2010 assume that the tax package will raise the level of real Gross Domestic Product (GDP) by 0.9%. That increase is spread over seven years with 0.4% occurring in the forecast period and the remaining 0.5% in the subsequent projection period. This note outlines the basis for those assumptions.

Taxes have pervasive effects on economic decision-making. Tax changes can change decisions in a host of ways, relatively few of which can be estimated with enough precision to be quantified and included in Budget economic forecasts and projections.

Therefore the estimated increase in GDP is largely based on estimates of the growth effects of the reduction in tax rates boosting labour supply. Potentially important positive effects that have not been quantified include the improved incentives to increase incomes through education, training, up-skilling and entrepreneurship, to stay in or move to New Zealand; and to save due to increased returns on household savings. In addition, measureable direct effects on investment work in opposite directions and in our judgement roughly balance out.

As the estimates are subject to relatively large margins of error, the aggregate long-run impact of the package could be materially higher or lower than the estimate of 0.9%. For instance, the studies surveyed in the last section of this note would suggest that an increase in GDP in the long run of up to 2% would not be particularly surprising.

## Framework

The conceptual framework used to generate the impacts of the tax package on the economy can be broken into two strands: the supply side and the demand side.

On the supply side, we assume that the potential output of the economy will be increased mainly due to the increase in labour supply. Our assumption is that the tax package has a negligible direct impact on the aggregate economy from the capital side

as the growth effects of the allocative improvements are offset by a higher effective average tax rate on firms due to changes to depreciation allowances more than offsetting the reduction in corporate tax rates.

On the demand side, the tax package has a wide range of impacts on various expenditure components of GDP. In particular, residential investment may be modestly reduced as those owning investor housing are no longer able to claim depreciation. By reducing inter-asset and inter-industry distortions, non-housing investment is expected to rise in the short to medium term. The tax package will affect the short-term path of private consumption as households bring forward consumption in anticipation of the GST increase, while the boost to real after-tax household incomes will increase post-implementation household consumption and saving.

## Supply Side

### Labour supply

Analysis based on Household Economic Survey (HES) data suggests that the package reduces the average total tax wedge on labour income (the sum of income tax and GST, expressed as a percentage of pre-tax income) by 1.2%. This would boost real after-tax incomes by about 1.8% on average.

We estimate this will increase private sector hours worked by 0.8% and increase participation rates by 0.5%, boosting GDP by about 0.9% over seven years. This assumes an elasticity of 0.44 for hours worked and an elasticity of 0.28 for workforce participation with respect to after-tax incomes (with a damping factor of 0.5 applied to the impact of the higher participation rate on GDP to adjust for the lower productivity of marginal workers).

We apply the average wage increases and elasticities to the labour market as a whole; we do not model different demographic and income groups separately.

The elasticity estimates are drawn from *New Zealand Labour Supply from 1991-2001: An Analysis Based on a Discrete Choice Structural Utility Model*, Guyonne Kalb and Rosanna Scutella, Treasury Working Paper 03/23 and the weights are based on the latest Taxwell data (see the following table).

	Married Men	Married Women	Single Men	Single Women	Sole parents	All
Hours worked elasticity	0.24	0.40	0.63	0.82	0.34	<b>0.44</b>
Weight	0.35	0.30	0.18	0.14	0.03	
Participation elasticity	0.17	0.2	0.44	0.47	0.08	<b>0.28</b>
Weight	0.22	0.32	0.15	0.22	0.09	

These elasticities have been benchmarked against, and are broadly similar to, Australian labour supply elasticities (*Modelling Labour Supply Responses in Australia and New Zealand*, Guyonne Kalb, Melbourne Institute of Applied Economic and Social Research University of Melbourne).

The package can be expected to further boost labour productivity in ways that are not captured in the above estimates. It increases incentives to study, train and seek career advancement, and to move to or stay in New Zealand. None of these effects are reflected in the estimates.

## Investment

There are three key driving forces which will affect firms' decision on business investment: changes in average company tax rates; changes in investment distortions; and changes in labour input.

The aggregate impact of the company tax rate reduction and the removal of depreciation allowances

While the tax package lowers the company tax rate, changes to thin capitalisation rules and depreciation allowances mean that, on average, firms will pay more tax as the reduction in the company tax rate does not fully offset the impact of higher taxable income owing to the base-broadening measures. As a result combined company and dividend tax revenues are estimated to be about 3-4% higher than in the absence of the package. In the case where all investment is financed by equity, this could increase the user cost of capital by about 0.6%.

Using the New Zealand Treasury Model (NZTM) we estimate that the increase in the user cost of capital leads to the private business capital stock reducing by 0.45% compared to what would have been the case in the absence of the package. This does not include residential housing stock.<sup>1</sup>

However, the effects on the private business capital stock are likely to be overestimated. First, if the investment were partially debt financed, changes in the company tax rate will tend to have smaller effects on user costs. Second, it is unlikely that capital is perfectly elastically supplied. Therefore, the impact of these changes is likely to be small once we allow for these factors.

Furthermore, the imputation system makes company tax a withholding tax for domestic shareholders. A domestic company that immediately distributes all its taxable profit to domestic residents in effect pays the personal tax rate of its shareholders rather than the company tax rate. As the personal tax rate reductions are larger than the reductions in the company tax rate, the imputation system serves to further reduce the average tax rate for companies that distribute dividends to natural person resident

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<sup>1</sup> For a detailed description of NZTM see *An Introduction to the New Zealand Treasury Model*, Michael Ryan and Kam Leong Szeto, Treasury Working Paper 09/02 at <http://www.treasury.govt.nz/publications/research-policy/wp/2009/09-02>.

shareholders. The size of this reduction depends on the proportion of shareholders that are natural person resident shareholders, shareholders' income levels, the dividend distribution policy of the company, and the extent to which the company is affected by the base-broadening measures. The effect of the personal tax rate changes on the effective tax rate of companies with trustee shareholders will also depend on the distribution policies of the trust (in particular whether it distributes trustee or beneficiary income).

### Reducing inter-asset distortions

The proposed base-broadening measures, such as the changes to depreciation rules, will significantly reduce tax-created inter-industry and inter-asset distortions. This will improve the allocation of investment. The positive effects of these changes on business investment are difficult to formally quantify and would require a multi-sector and multi-asset General Equilibrium (GE) model. However, the base-broadening measures are likely to cause a shift of investment from the housing sector to the non-housing sector as discussed below. In principle, the reduction in investment distortions could affect both multi-factor productivity and investment levels.

### Higher labour input

As discussed above, we expect that the reduction in personal income tax will boost labour supply. Higher labour input will eventually lead to higher output in the long run. With fixed capital, higher output will lead to a higher marginal return to capital. As a result, firms are expected to increase investment until the marginal product is equal to the required rate of return on business capital. Under this package we estimate that private sector labour input will increase by at least 1.3%. In the neoclassical framework that underpins NZTM, a 1.3% increase in private sector labour input will produce a 1.3% increase in the business capital stock.

In summary, the overall impact of the base-broadening measures on the capital stock is likely to be negligible. The increase in labour supply is expected to raise overall investment, while maintaining a path for the ratio of capital to labour that is unchanged relative to the baseline in the long run.

### Adjustment path

The speed and nature of the adjustment path to the new potential output of the economy is very uncertain due to the fact that these types of change are infrequent. Our judgement is that at the current state of the business cycle (i.e., a relatively soft labour market) cyclically weak demand-side factors may initially blunt the supply-side response. As a result, we assume that 0.40% of the potential increase in labour supply, will occur by the end of the forecasting period (about 14 quarters after the implementation). The remaining 0.50% is projected to happen by 2016/17.

## Demand Side

### Residential investment

We expect that the removal of housing depreciation and other changes in the tax package will have a negative impact on house prices and the size of the housing stock. Our estimates are broadly based on an empirical model (*A Simple Model of Housing Rental and Ownership with Policy Simulations*, Andrew Coleman and Grant Scobie, Treasury Working Paper 09/05). Using the best estimates of the likely values of the underlying parameters, this model suggests that the removal of housing depreciation could lead to a fall in house prices of 0.2% and a very small reduction of the housing stock in the long run. Our judgement is that combined with other tax changes such as the reduction in personal income tax, the removal of housing depreciation will result in a house price fall of around 2% over the next year relative to baseline, and in comparison to the baseline a reduction of \$750 million in the real residential housing stock over the forecast period.

### Private consumption and saving

The expectation of the increase in the GST rate on 1 July 1989 led to stronger real consumption growth during the June 1989 quarter, which was then offset by a drop in consumption in the following quarter. Therefore, we also expect that households will bring consumption forward in anticipation of the GST rate increase. Compared to baseline we assume that there is a 3% increase in non-housing private consumption in the quarter just before the GST rate increase and a 3% reduction in non-housing consumption in the quarter in which GST is raised.

The tax package increases household real incomes and therefore consumption, although given the assumed effects on saving the average marginal propensity to consume falls slightly. The reduction in income tax rates will boost after-tax returns by about 5%, potentially boosting household saving by 1.5% (with a savings elasticity of 0.30). The potential impact of longer-run productivity and risk improvements from increased household saving in improving investment-saving imbalances are not quantified.

### Inflation

The 1 October 2010 increase in the rate of GST from 12.5% to 15% is estimated to increase the rate of CPI inflation by 2% in the December 2010 quarter. We assume that the Reserve Bank will look through the first-round impacts of this policy decision and inflation expectations are well anchored. As a result, we dampened the impact of higher GST on wage demands. It is assumed that the increase in inflation has no impact on public sector wage rates (i.e., the Government considers that its employees have been compensated for higher prices through the changes to personal tax rates).

## Reconciliation to aggregate estimates

Empirical work by the OECD has estimated the effect of shifting 1% of tax revenues from income taxes to consumption and property taxes. The current tax package corresponds to a tax shift of around 4% of revenue from personal taxes to GST. Applying the OECD estimates generates a level of GDP per capita that is 1% to 4% higher than the baseline after 10 years. The per capita growth rates would be around 0.1 to 0.4 percentage points higher than in the baseline (eg, becoming 1.6% to 1.9% instead of 1.5%) during the transition period.

In addition, Treasury analysed three empirical studies judged by an external reviewer to be particularly suitable to apply to the New Zealand context. These use a range of specifications and tax measures to examine the relationship between aggregate taxation parameters and GDP growth. They suggest that the current package can be expected to boost the level of GDP by 0.30% to 3%.

Modelling work by the IMF (undertaken as part of the 2010 Article IV Consultation) finds that a shift of capital and labour taxes to GST of approximately 1% of GDP would be likely to raise the level of GDP by almost 1% after 5 to 6 years. If approximately 1% of GDP labour taxes are shifted to GST (without a shift in capital taxes) the gain in output is around 0.5%. The full set of modelling work is to be released in a forthcoming IMF paper.

Therefore the estimated 0.9% increase in GDP arising from our micro-analysis (mostly arising from increased labour supply) is not inconsistent with the aggregate estimates. It is consistent with the lower-end estimates obtained using the OECD aggregate estimates and other credible studies.

This is not particularly surprising. Although there are positive and negative margins of error around our labour supply and investment effect estimates, the aggregate estimates capture other generally positive but non-quantifiable effects that may affect aggregate GDP growth. That is, our quantitative 'bottom-up' estimates do not incorporate additional aggregate-level growth effects of the tax package. However, we prefer the 'bottom-up' approach as it provides a clear chain of micro-economic logic, while the aggregate studies use econometrics to analyse the relationships between aggregate tax and economic variables without illuminating why the variables interact in the way they do.