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No Miracles Here: Trade Policy, Fiscal Policy and Economic Growth

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Abstract:

In this paper we consider whether the effects of trade liberalisation on GDP growth are offset by changes in other policy variables, namely changes in fiscal policy. Governments increase welfare spending as a response to greater exposure to international trade. We find for a sample of developing countries that this is not the case. Countries that liberalise their trade regimes do increase their spending on welfare, but once we control for fiscal policy trade liberalisation still has no effect on the rate of growth. Fiscal policy itself has the expected effect on GDP growth. The paper uses a difference-in-difference approach for a matched sample of non-liberalising countries.

JEL codes: F43, H5, O40, O57

Outline

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2. Econometric Methodology
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Non-Technical Summary

This paper considers the relationship between trade policy, fiscal policy and the rate of economic growth in developing countries. By studying them simultaneously we seek to determine whether the effect of trade liberalisation on fiscal policy can explain the lack of a robust relationship between trade liberalisation and economic growth for developing countries in the existing empirical literature. Three questions are addressed in the paper: firstly, does trade liberalisation cause the growth rate of GDP to increase; secondly, does trade liberalisation cause changes in fiscal policy; and finally does the financing of these changes in fiscal policy offset the growth effects of trade liberalisation.

Recent work by Slaughter (2001) has questioned the conventional wisdom amongst empirical researchers and policy practitioners that trade liberalisation might be used by developing countries to close any development gap. Slaughter compares the growth rate before and after trade liberalisation with the change in the growth rate in OECD countries in which no trade reform took place (this approach is called difference-in-differences). Controlling for the counterfactual, what would have happened to the growth rate in the absence of trade reform, purges the results of the effects of common shocks that occur simultaneously with trade liberalisation. We consider whether this conclusion holds for developing countries.

In this paper we compare sets of countries that had highly restrictive trade policy but liberalised against countries that similarly restrictive trade regimes but in which no liberalisation took place. A simple post liberalisation comparison of growth rates yields results typical of those found in the previous literature. The average growth rate in the time periods after trade liberalisation is significantly higher than that in the period before liberalisation. However, when this change in the growth rate is compared against that for countries that did not liberalise we find that the post trade liberalisation growth rate is not significantly different to that before trade liberalisation. The increase in growth that took place in liberalising countries also took place in non-liberalising countries i.e. trade liberalisation did not cause growth rates to increase (it was some other external factor).

While the above results suggest that trade liberalisation does not affect the rate of growth in developing countries we cannot rule out the possibility that the positive effects of trade policy reform on growth are somehow offset by the effects of other policy changes. As Sachs & Warner (1995) recognise, a broader range of reforms such as macroeconomic stabilisation, legal reform and privatisation usually accompanies trade policy reform. However, these appear unlikely candidates to provide an offsetting effect to trade reform. Evidence from elsewhere in the literature suggests that changes in fiscal policy may provide these offsetting effects.

While the empirical link between trade liberalisation and fiscal policy has not generally been investigated, the link between the level of trade openness and fiscal policy has. Trade liberalisation may have an indirect effect on the growth rate via fiscal policy if, as Rodrik

(1998) argue, countries that are more open to international trade also have larger governments. According to this view governments provide greater levels of social insurance to offset greater exposure to external shocks associated with openness to international trade. Barro (1990), Kneller, Bleaney & Gemmell (1999) and Bleaney, Gemmell & Kneller (2001) provide theoretical and empirical evidence that changes in fiscal policy may affect growth, and importantly that differences in the method of changes in fiscal policy may yield differing effects on growth.

In contrast to the findings for liberalisation and growth, liberalisation is found to affect the level of social security and welfare spending. Their levels relative to GDP are higher after liberalisation than before, even after controlling for what happened to welfare spending in countries that did not liberalise their trade regimes. This same pattern does not hold for other measures of government expenditures and tax revenues. Importantly this indicates that countries differ in the method they use to finance trade-policy induced increases in welfare spending, such that the growth effect of trade liberalisation may (through these indirect effects) also differ.

These results suggest that controlling for changes in fiscal policy when testing for the causal effect of trade liberalisation on growth may therefore be important. However the addition of fiscal indicators to the difference-in-difference regression of growth rates does not change the results for trade liberalisation. While the fiscal variables enter the regression with the expected coefficients the previous finding of no growth effect from trade liberalisation remains. We conclude from this paper that trade liberalisation in developing countries does appear to affect the growth rate, but its effects are indirect, through changes in the mix of government expenditures and revenues. No direct effect is evident.

Trade policy reform has previously been identified as an important explanation of the ‘miracle’ growth performance of the South East Asian economies in the post-war period, while Jones (1995) describes the possibility of offsetting growth effects from several policy variables as the miracle case. Either way, it appears that trade liberalisation itself offers no miracles for economic growth in developing countries.

1: Introduction

This paper considers the relationship between trade policy, fiscal policy and the rate of economic growth in developing countries. By studying them simultaneously we seek to determine whether the effect of trade liberalisation on fiscal policy can explain the lack of a robust relationship between trade liberalisation and economic growth for developing countries in the existing empirical literature.

Conventional wisdom amongst empirical researchers and policy practitioners has been that trade liberalisation within developing countries causes them to growth faster helping to close any development gap. For example see the empirical evidence contained in Sachs & Warner (1995), Harrison, (1996) and Edwards (1998); while World Bank Structural Adjustment Loans have been made conditional on trade liberalisation (Greenaway & Milner, 1993). Slaughter (2001) questions the general robustness of these conclusions using a difference-in-difference approach for a sample of OECD countries.[1] The growth rate before and after trade liberalisation in one of four periods (the creation of the EEC, the creation of EFTA, trade liberalisation between EEC and EFTA and the Kennedy round) is compared against the change in the growth rate in OECD countries in which no trade reform took place. Controlling for the counterfactual, what would have happened to the growth rate in the absence of trade reform, purges the results of the effects of common shocks that occur simultaneously with trade liberalisation. Using this approach Slaughter (2001) finds no effect from trade liberalisation on the rate of convergence amongst countries. One of the contributions this paper makes is to consider whether the Slaughter (2001) conclusions hold when we consider trade reform in developing countries, also using a difference-in-difference approach. A strong justification for focusing on developing countries is the very extensive and sometimes dramatic trade reforms that occurred in many developing countries in the last quarter century.

Two sets of liberalising countries are considered in the paper. Firstly, those that switch from being 'closed' to 'open' to international trade in Sachs & Warner (1995) (hereafter

[1] Rodrik & Rodriguez (2000) have also questioned the robustness of the results from this literature, but from the perspective of the indicators of trade liberalisation used and their robustness to changes in the sample frame.

SW) and secondly, the list of trade reformers identified in Dean, Desai & Riedel (1994) (hereafter DDR). The control group is chosen as those countries that remain closed to international trade according to SW during the 1975 to 1993 time period. From simple first difference regressions we find for both the SW and DDR measures that the average growth rate in the time periods after trade liberalisation is significantly higher than that in the period before liberalisation. These results match similar findings in Sachs & Warner (1995). However, when a difference-in-difference approach is used and trade liberalising countries are compared to those that remained closed to international trade we find that the post trade liberalisation growth rate is not significantly different to that before trade liberalisation. Given that Rodrik & Rodriguez (2000) argue the SW measure of openness usually generates a positive and significant effect from trade liberalisation on growth our results from the difference-in-difference regressions are striking.

While the above results suggest that trade liberalisation does not affect the rate of growth in developing countries we cannot rule out the possibility that the positive effects of trade policy reform on growth are somehow offset by the effects of other policy changes. As Sachs & Warner (1995) recognise, a broader range of reforms such as macroeconomic stabilisation, legal reform and privatisation usually accompanies trade policy reform. However, these appear unlikely candidates to provide an offsetting effect to trade reform. Thus a second contribution of the paper is to consider instead whether the method of financing trade policy induced changes in government welfare spending may yield differing growth effects. Within the previous literature only Wacziarg (2001) appears to recognise the possibility of an indirect effect of trade liberalisation on growth through fiscal policy. Moreover, his results would appear to support the argument that fiscal policy may serve to offset the positive growth effects of trade liberalisation. In that paper increased openness is found to increase the level of government consumption spending, which in turn is found to reduce the rate of growth. Of the numerous channels considered by Wacziarg that conclusion is unique to fiscal policy.

While the empirical link between trade liberalisation and fiscal policy has not generally been investigated, the link between the level of trade openness and fiscal policy has. Trade liberalisation may have an indirect effect on the growth rate via fiscal policy if, as Rodrik (1998) and Cameron (1978) argue, countries that are more open to international trade also have larger governments. According to this view governments provide greater levels of

social insurance to offset greater exposure to external shocks associated with openness to international trade.

The correlation between trade openness and fiscal policy is again, not uncontroversial however. Alesina & Wacziarg (1998) contest the Rodrik-Cameron hypothesis, arguing that the trade openness/ government size relationship is generated not by any true causal relationship but by an omitted variable bias. There are economies of scale in supplying public goods, such that larger countries tend to have smaller governments; whereas smaller economies tend to be more open to international trade. Therefore, if country size is omitted from the regression equation openness will be spuriously positively correlated with government size. The results in this paper contribute to this debate by considering the causal effects of trade liberalisation on a number of fiscal variables, again using a difference-in-difference approach.

In contrast to the findings for liberalisation and growth, liberalisation is found to affect the level of social security and welfare spending. Their levels relative to GDP are higher after liberalisation than before, even after controlling for what happened to welfare spending in countries that did not liberalise their trade regimes. The Rodrik-Cameron hypothesis that openness to international trade is associated with government size therefore has some empirical support. This same pattern does not hold for other measures of government expenditures and tax revenues. Importantly this indicates that countries differ in the method they use to finance trade-policy induced increases in welfare spending, such that the growth effect of trade liberalisation may (through these indirect effects) also differ.

The link between fiscal policy and GDP growth is provided by Barro (1990), Kneller, Bleaney & Gemmell (1999) and Bleaney, Gemmell & Kneller (2001). In the Barro (1990) model the growth effects of various government tax and expenditure policies depend on their classification as one of four types. Decreases in distortionary taxes and increases in productive expenditures raise the steady state rate of growth, whereas non-distortionary and non-productive expenditures have no direct effect. One important policy conclusion that can be drawn from the Barro model is that the growth effect of any particular change in fiscal policy on growth can only be properly identified with reference to the government budget constraint, the chosen method of financing. Drawing on the earlier work of Mofidi & Stone (1989) and Miller & Russek (1997), Kneller et al. (1999) test the empirical

counterpart of the Barro model. They find that once the government budget constraint is properly specified in the estimated regression the predictions of the Barro (1990) contain empirical support, although again for a sample of OECD countries.

The results from the above literature suggest that controlling for changes in fiscal policy when testing for the causal effect of trade liberalisation on growth may therefore be important. However the addition of fiscal indicators to the difference-in-difference regression of growth rates does not change the results for trade liberalisation. While the fiscal variables enter the regression with the expected coefficients the previous finding of no growth effect from trade liberalisation remains. This result is found to be robust to the use of instrumental variable estimation to account for the potential endogeneity of the fiscal variables.

We conclude from this paper that trade liberalisation in developing countries does appear to affect the growth rate, but its effects are indirect, through changes in the mix of government expenditures and revenues. No direct effect is evident. Trade policy reform has previously been identified as an important explanation of the 'miracle' growth performance of the South East Asian economies in the post-war period, while Jones (1995) describes the possibility of offsetting growth effects from several policy variables as the miracle case. Either way, it appears that trade liberalisation itself offers no miracles for economic growth in developing countries.

The rest of the paper is organised as follows, Section 2 outlines the econometric methodology to be used and discusses the data. Section 3 reports the empirical results in three parts. Firstly, we consider whether the Slaughter (2001) results for OECD economies hold for developing countries. Having established that they can, the second part considers the effect of trade policy reform on fiscal policy. The third part considers the effect of trade reform on the rate of growth, controlling for the effects of fiscal policy. Finally Section 4 concludes.

2: Econometric Methodology and Data

In this paper we start with the matched difference-in-difference approach described in Slaughter (2001). Further details of this methodology can be found in Blundell and Costa

Dias (2000). As stated above, the aim of the paper is to evaluate the causal effect of a change in trade policy on the rate of growth and the level of government spending (which we denote in both cases by *g*). Let $TPOL_{it} \in \{0,1\}$ be an indicator (dummy variable) of whether country *i* altered its trade policy at time period t, and g^1_{it+s} the outcome, the growth rate (government spending), at time $t+s$,[2] following the change in policy. The term Δg^1_{it+s} measures the change in the growth rate (government spending) over the treatment period for the treatment group, the trade liberalisers, and the term Δg^0_{it+s} defines the change in the rate of growth (government spending) in country *i had it not* altered its trade policy. The causal effect of trade liberalisation for country *i* at time period $t + s$ is therefore defined as, the change in the growth rate (government spending) over period $t+s$ if trade liberalisation occurred less the change in the growth rate (government spending) in period $t+s$ if trade liberalisation had not occurred. We can write the average effect as follows:

$$E\left\{\Delta g^1_{t+s} - \Delta g^0_{t+s} \mid TPOL_{it} = 1\right\} = E\left\{\Delta g^1_{t+s} \mid TPOL_{it} = 1\right\} - E\left\{\Delta g^0_{t+s} \mid TPOL_{it} = 1\right\} \quad (1)$$

It is of course the case that the change in the growth rate (government spending) in country *i* had it not liberalised its trade policy, Δg^0_{it+s}, is unobservable. Casual inference in this case therefore relies on the construction of this counterfactual. Sachs & Warner (1995) and Greenaway et al. (2002) assume (implicitly) that the second term in equation (1) is zero and therefore interpret the change in the rate of growth (government spending) in the periods before and after liberalisation as the causal effect of trade liberalisation. This comparison of growth rates (government spending) before and after trade liberalisation is only valid in the absence of shocks to the economy. In this paper, the counterfactual is constructed instead using countries that had a similar trade regime in period *t* but who did not liberalise their trade regimes. $E\left\{\Delta g^0_{t+s} \mid TPOL_{it} = 1\right\}$ in equation (1) is measured using $E\left\{\Delta g^0_{t+s} \mid TPOL_{it} = 0\right\}$. An important feature in the construction of the counterfactual is the selection of a valid control group. We discuss the method used in this paper through a discussion of the data used to measure trade liberalisation below.

We use two measures of trade liberalisation, one from Sachs & Warner (1995) and the other from Dean et al. (1994). Both are dummy variable measures. As Greenaway et al.

[2] Where $s \geq 0$.

(2002) note such measures have the advantage that they capture the multi-faceted nature of trade reform, but the disadvantage that they are often subjective in nature.[3]

Trade liberalisation under the SW measure occurs when there is a change in the classification of a country as either open or closed to international trade. A country is defined as closed if it meets any one of the following criteria.

a) Tariffs rates of 40 per cent or more.
b) Non-Tariff barriers covering 40 per cent of trade or more.
c) Black market exchange rate premium that is depreciated by 20 per cent or more relative to the official exchange rate.
d) A state monopoly on major exports.
e) Socialist economic system.

According to the data some 37 countries switch from being closed to open from 1970 onwards, while some 35 countries are classed as being closed throughout the entire period under study. Lists of both types of countries along with the year of liberalisation indentified by Sachs & Warner (1995) can be found in the Appendix.

Despite criticisms of the Sachs & Wanrer (1995) measure there are a number of reasons for choosing it to perform a difference-in-difference analysis of trade liberalisation and growth. Firstly, the results from the difference-in-difference approach are known to depend upon the appropriate construction of the control group. As Greenaway et al. (2002) note the Sachs and Warner measure sets the cut-off between open and closed at a fairly restrictive level. The SW measure therefore forces the comparison of countries in which the trade regimes in the initial period was unquestionably closed to international trade. This might be expected to have the additional benefit of reducing possible heterogeneity of the impact of trade liberalisation on growth across countries. Secondly, Rodrik & Rodriguez (2000) find that the SW measure tends to generate results that suggest that the relationship between trade liberalisation and growth is positive and significant. Given that we fail to find evidence of a causal relationship we might have greater confidence in the conclusions of the paper.

[3] See also Harrison (1996) for an interesting discussion of the measurement problems associated with trade policy.

To address concerns surrounding the use of the SW measure we consider the robustness of the results to changes in the measure (which we detail below) as well as the use of a second indicator of liberalisation, which draws on the work of Dean et al. (1994). In that paper the timing of liberalisation is based on data for tariffs, quotas export impediments & promotions and exchange rate misalignment. We have data on some 20 countries that are defined as having liberalised in the post-1985 period by DDR. Again this list of countries along with the year of liberalisation can be found in the Appendix. Although based on similar indicators of trade policy to SW the DDR list of countries differs in its classification. Differences arise because the DDR measure does not prior organise countries as open or closed to international trade. For example, the DDR list includes Malawi, Pakistan and Senegal, all of which are classed as countries that have never opened to international trade under SW. Where the overlap between the list of liberalising countries in DDR and the 'never open to international trade' countries in SW exists we include these countries in the group of liberalised countries.

In addition to differences in the list of countries defined as liberalisers by DDR and SW there are also differences in the dating of trade liberalisation. In the DDR measure liberalisation occurs at some point between the years 1985 to 1989, whereas in SW liberalisation occurs at some point between the years 1976 and 1995 (with the majority in the period 1985 to 1995). Indeed trade liberalisation is dated in the same year in the two studies for only one country (Venezuela). While these differences might be used as an additional test of robustness we choose to minimise their impact by averaging the data across five year periods. The specific year of trade liberalisation is therefore condensed into one of the periods 1970-74, 1975-79, 1980-84, 1985-89, 1990-94, 1995-98. This also allows us to control for the fact that liberalisation is often not conducted in a single year but spread across adjacent years.[4] A similar approach is adopted by Wacziarg (2001)

All of the remaining data we use is taken from the *World Bank Databank*, although the fiscal data is originally from the *Government Financial Statistics*. Some summary statistics of the average annual rate of GDP growth and fiscal variables are reported in the Appendix for various sub-samples. As explained above the impact of fiscal policy on the growth rate

[4] These concerns are in addition to those usually given for period averaging the data given in growth studies.

depends in the Barro (1990) model upon its classification as one of the four types. In matching fiscal data to the theory we follow Kneller et al. (1999) and Bleaney et al. (2001) (to which we add the budget surplus as an additional item). The classification of the fiscal data are detailed in the Appendix.

In addition to matching on the openness of trade policy in the initial time period we also match according to the level of GDP in the initial time period. Initial GDP has been found to be a robust indicator of future growth rates by Levine & Renelt (1992), Sala-i-Martin (1996) as well as fiscal policy variables (Tanzi & Schuknecht, 2000; Persson & Tabellini, 1999). Countries from the group of trade liberalisers are matched to those in the control group so as to minimise the absolute difference in the level of GDP in the period before liberalisation. We assume that countries that do not liberalise their trade regimes can act as a match for more than one liberalising country in the sample, but cannot act as a match for more than one country where the period of liberalisation differs. For example if country A is used as a match for country B, where trade liberalisation occurred in the period 1985-90, then country A cannot also operate as a match for country C, where country C liberalised in the period 1990-95. In such a case an alternative match is used to minimise the sum of the absolute difference in GDP for country B or C. This restriction is relevant for the SW measure only.

The difference-in-difference methodology is applied in the paper through the estimation of the following equation:

$$g_{it}^{L} = \alpha_{oi} + \beta_0 D_{21} + \beta_1 D_{31} + \gamma_0 D_{21}^{L} + \gamma_1 D_{31}^{L} + \varepsilon_{it}^{L} \qquad (2)$$

where g_{it} is the growth rate (government spending) in country i in time period t, while the coefficient α_{oi} captures fixed time effects in country i[5]; the common time effects are captured by β_0 and β_1. Three time periods are used; the 5-year period before liberalisation, the 5-year period in which liberalisation occurred and the 5-year period after that. The last term period picks up the lagged effects of trade liberalisation on growth. The β coefficients in equation (2) measure growth relative to the time period before liberalisation. The

[5] We might restrict the fixed time effects to be indexed according to liberalisation, that is to restrict for example the fixed time effects to be the same in all liberalising countries, although in practice this has no bearing on the results.

superscript L is a 0/1 dummy indicating liberalisation. The causal effect of trade liberalisation is therefore measured through the parameters γ_0 and γ_1. Again these are measured relative to the time period before liberalisation.

In order to compare the results from this paper to those found elsewhere in the literature we also estimate the equation:

$$g_{it} = \alpha_{oi} + \gamma_0 D_{21} + \gamma_1 D_{31} + \varepsilon_{it} \qquad (3)$$

This regression is estimated only for countries that liberalised their trade regimes. A similar regression can be found in SW. The γ coefficients in equation (3) measure the change in the growth rate in the 5 year period contemporaneous with trade liberalisation and the lagged effect of liberalisation all relative to the period before trade liberalisation.

3: Empirical Results

3.1: Trade Liberalisation and Growth

In Table 1 we compare the growth rate of liberalising countries before and after trade reform, but without including the control group of non-liberalisers. These regressions are reported to ensure that the results in this paper do not differ from those in the previous literature because of the particular indicators of trade liberalisation used or the construction of the comparison time periods. Several tests of the robustness of these results are also performed.

In regressions 1 and 2 we find that despite differences in the list of countries that have reformed their trade regimes between the SW and DDR measures the results are remarkably similar. Relative to the period before trade reform the rate of growth in the contemporaneous period was in the order of 1 percentage point per annum higher. These differences lie just outside of standard significance levels for both of the liberalisation indicators. The medium term effect of trade reform on growth is however significant. The average annual growth rate was 1.65 percentage points higher in the second 5-year period after trade reform when using the DDR list of trade reformers and 2.01 percentage points

higher when using the SW list of trade reformers compared to the 5-year period before the reforms took place. These results closely match those found in SW despite differences in the construction of the various time periods and are consistent with those reported in Greenaway et al. (2002).

Table 1: Growth Effect of Trade Liberalisation (no control group)

Regression No.	***1***	***2***	***3***	***4***	***5***
Dependent Variable	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*
Trade liberalisation indicator	*SW*	*DDR*	*SW BMP and EMB removed*	*SW 1985-89*	*SW 1990-94*
Liberalisation Effect Period T	**0.807** **(1.43)**	**1.138** **(1.60)**	**1.409** **(1.60)**	**1.576** **(2.41)***	**0.279** **(0.32)**
Liberalisation Effect Period T+1	**2.018** **(3.01)****	**1.657** **(2.08)***	**2.754** **(2.22)***	**2.705** **(3.52)****	**1.868** **(1.71)+**
Constant	-0.018 (0.04)	0.534 (0.93)	-0.393 (0.52)	-1.026 (1.76)+	0.289 (0.42)
Observations	110	60	42	53	51
R-squared	0.54	0.66	0.34	0.52	0.38

Regressions include fixed country effects.
Robust t-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Rodrik & Rodriguez (2000) argue that the results from the SW classification of openness is dependent on the use of the Black Market Premium (BMP) and Export Marketing Board (EMB) in its construction. We therefore drop those countries in which the BMP and EMB are solely responsible for the classification of a country as closed to international trade.[6] The results presented in regression 3 show that even when using a measure of openness favoured by Rodrik & Rodriguez (2000) countries that liberalise their trade regimes are found to have faster growth in the periods after trade liberalisation than before.

In order to provide initial evidence that accounting for period specific economic shocks may be important we report the results from separating countries according to the time period in which liberalisation occurs. Regressions 4 and 5 compare the effects of trade liberalisation using the SW measure, but splitting the sample into those in which

[6] The data used in the construction of this new measure is from Table 6 of SW (1995). There are a further 6 countries where a lack of data prevents us from being certain as to the dependence on BMP and EMP and so we drop these countries. The results are not dependent upon this decision.

liberalisation occurred in the 1985-89 period and those in which liberalisation occurred in the 1990-94 period.[7] There is some sensitivity of the results to this sample split. For those countries in which trade liberalisation occurred in the 1985-90 period the growth rate in the period contemporaneous to trade liberalisation is some 1.5 percentage points per annum higher than the period before liberalisation. In contrast, for countries that liberalised trade in the period 1990-94 the growth rate in the contemporaneous period is only 0.3 percentage points higher than the period before the trade reform. Where in regression 4 the increase in the growth rate is significant at the 5 per cent level in regression 5 the same term is far from significant. The lagged effect of trade reform, while smaller in magnitude in regression 5, is significant in both regressions. One interpretation of these results is that trade reform added an average 2.7 percentage points to the growth rate when using the 1985-89 reformers and 1.9 percentage points when using the 1990-94 reformers. Results presented below suggest that such a conclusion is premature.

3.2: Trade Liberalisation and Growth: A Difference-in-difference Approach

In Table 2 we report the results from our matched difference-in-difference regressions. As described above countries are matched as having trade regimes that are initially closed to international trade and by initial GDP.[8] A list of the countries used in the estimation of each of the matched regressions can be found in the Appendix. Reported in the table are the time effects common to both liberalisers and non-liberalisers to control for period specific shocks to countries (measured relative to the period before liberalisation), β_o and β_1 in equation (2); the effect of liberalisation on the growth rate (relative to the period before liberalisation), γ_0 and γ_1 in equation (2). Fixed country effects are included in all of the regressions except regression 7, but are not reported to conserve space.

Once the effects of common time specific shocks are controlled for, we find no evidence that trade liberalisation has a significant effect on the rate of GDP growth (regression 6). Using the SW data we find the average growth rate 5-years after liberalisation is in the order of 2.8 percentage points higher than the average growth rate in the time period before

[7] All trade reform under the DDR measure took place in the 1985-89 period.
[8] Owing to the fact that trade liberalisation took place in Botswana and Chile much earlier than the other countries in the sample we choose to omit them from the matching process.

liberalisation and statistically significant. However this increase in the growth rate is common to all countries in the sample. The effect on the growth rate specific only to those countries that liberalised their trade regimes is on average only 0.1 percentage points per annum and far from statistically significant.[9] The increase in the average growth rate found in the post liberalisation periods in Table 1 appear to have also occurred in countries that did not liberalise their trade policy.

We assume throughout the paper that changes in trade policy are exogenous. Changes in trade policy occur because of changes in political/economic ideology (or external pressures from the World Bank, IMF etc.) and not because of improvements in the level of development. There remains the possibility however, that the results found in regression 6 are generated because countries liberalise their trade regime *after* a period of strong growth, or because the improvement in growth occurs in anticipation of the removal of barriers to trade. While it is difficult to rule out this possibility, it is worth noting that for the sample of countries used there is no evidence that the average growth rate was significantly different in the pre-liberalisation period between countries that subsequently liberalised their trade regime and those that did not. Adding a dummy variable indicating future trade liberalisation to a cross-section regression of trade liberalising countries and the control group yields a coefficient that is negative (at –0.239 per cent per annum) and insignificant (t-statistic of 0.26).[10]

Further evidence on the endogeneity issue can be found in Sachs & Warner (1995) though they have the opposite concern; that their results are generated because countries liberalise their trade regime as a response to slow rather than above average growth. After further investigation Sachs & Warner (1995) find that countries that liberalised temporarily grew more slowly in the period in which they were classed as closed compared to the earlier period in which they were classed as open.

In regressions 7, 8, 9 and 10 we test the robustness of the results to the removal of the country fixed effects, the addition of calendar time dummies, the exclusion of those countries with large changes in tariff and non-tariff barriers and the use of the DDR

[9] The evidence presented in Table 2 is robust to the inclusion of additional conditioning variables such as initial GDP, the investment to GDP ratio and terms of trade shocks.
[10] The countries used in this regression are those included in the estimation of regression 6 below.

indicator of liberalisation. Regression 7 restricts the country specific fixed effects in regression 6 to be identical in all liberalisation countries. The results for the liberalisation dummy therefore indicates whether in the absence of time specific effects and trade liberalisation the average growth rate of countries that liberalised their trade regimes is higher or lower than that of non-liberalisers. The answer would appear to be that they are not statistically different, indeed the point estimate on the fixed liberalisation effect is negative.

The event time dummies in equation 2 attempt to control for the effects on growth that are contemporaneous with trade liberalisation. This may be imperfect however if the trade liberalisation occurs in the sample across more than one time period, as it does for the SW measure. In regression 8 we add calendar time dummies in addition to the event time dummies. In practice this has little effect on the results. The calendar time dummies are insignificant and engender no changes in the significance of the variables of interest.

The effect of trade liberalisation on GDP differs between Tables 1 and 2 because of the addition of a control group of non-trade liberalising countries to the sample. The results from Table 2 are therefore a product of the choice of countries included in this control group. We investigate the sensitivity of results to this choice in regressions 9 and 10. In regression 9 we test the robustness of the results for the S&W measure to the exclusion of those countries that form part of the control group yet also conducted some trade reform.[11] These countries undertook some form of partial trade liberalisation in that they remain closed to international trade on the SW definition. In regression 10 we use the DDR indicator of trade liberalisation.

The reported results in regressions 9 and 10 appear robust to these concerns. Indeed the point estimate in regression 9 now indicates that the growth rate in the years after trade reform was lower relative to the years before. Some of the detail differs when using the DDR but the general findings remain the same. The growth rate in the period after trade liberalisation is not significantly different to the average growth rate in the period before reform. In regression 10 the point estimate of the liberalisation specific effects are large at

[11] For ease we exclude the matched country also from the sample.

close to 1 percentage point, but they are poorly defined and far from standard significance levels.

Table 2: Effect of Trade Liberalisation on GDP Growth: Difference-in-difference regressions.

Regression No.	**6**	**7**	**8**	**9**	**10**
Dependent Variable	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*
Trade liberalisation indicator	*SW*	*SW no fixed effects*	*SW calendar time effects*	*SW large shift tariffs removed*	*DDR*
Event Time Period T	0.321 (0.30)	0.282 (0.24)	0.618 (0.59)	0.883 (0.63)	-0.001 (0.00)
Event Time Period T+1	2.146 (2.05)*	2.107 (1.92)+	2.795 (2.48)*	2.728 (2.12)*	0.733 (0.63)
Liberalisation Effect Period T	**0.609** **(0.50)**	**0.651** **(0.49)**	**0.569** **(0.48)**	**-0.410** **(0.26)**	**1.138** **(0.94)**
Liberalisation Effect Period T+1	**0.137** **(0.11)**	**0.179** **(0.14)**	**0.122** **(0.10)**	**-0.620** **(0.40)**	**0.924** **(0.65)**
Liberalisation Dummy		-0.239 (0.26)			
Calendar time Period 1985-89			0.704 (1.13)		
Calendar time Period 1990-94			-0.537 (0.80)		
Constant	-0.294 (0.81)	-0.133 (0.17)	-0.658 (1.33)	-0.383 (0.83)	0.493 (1.11)
Observations	163	163	163	115	93
R-squared	0.42	0.10	0.44	0.41	0.68

All regressions except 7 include fixed country effects.
Robust t-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

3.3: GDP Growth, Fiscal Policy and Trade Liberalisation

Alesina & Waziarg (1998) argue that the openness, government size relationship found by Rodrik (1998) is generated by an omitted variable bias, the exclusion of an indicator of country size. The link between government size and country size is negative, there are economies of scale in the provision of government goods and services, as is the correlation between trade openness and country size, as suggested by the gravity equation. When

country size is omitted and trade openness included in a regression of the determinants of government expenditure the openness variable proxies for the country-size government-size relationship generating a positive coefficient. If both size and openness are included in the regression the significant relationship between openness and government size disappears. Alesina & Wacziarg (1998) suggest from this that there is no causal relationship between trade openness and government size. We address this issue using trade liberalisation and government size in a difference-in-difference regression.

In regressions 11 to 16 (Table 3) we estimate the difference-in-difference regressions but replace the growth rate of GDP with various fiscal indicators. [12] The fiscal variables used are: social security and welfare spending, the budget surplus, distortionary tax revenues, productive expenditures and total revenues and total expenditures, all expressed as percentage ratio of GDP. Of these only welfare and social security spending appears to be significantly affected by trade reform.[13] The level of welfare spending is an average of 0.5 per cent of GDP higher than before reform in the contemporaneous period and 1 per cent of GDP higher in the latter period. It is worth pointing out that if trade reform were reflected in the reduction in tariff rates then the loss of government revenue would *ceteris paribus* lead to a reduction in government expenditures not an increase.

The point estimates for several of the other fiscal variables are in some cases larger than those on welfare spending, but the standard errors are large such that they lie well below standard significance levels. This pattern of results suggests that the method of financing changes in social security and welfare spending differs across countries. This is further supported by the results for the budget surplus (regression 12), total revenues (regression 15) and total expenditures (regression 16) where the causal effect of trade liberalisation are found to be insignificant. These results lend partial support to the Rodrik (1998) hypothesis that larger governments are also more open to international trade. Openness to trade is associated with higher spending on social security and welfare, but not other types of government spending.

[12] The reported results all use the SW indicator of trade liberalisation. In the case of the DDR liberalisation indicator the reduction in the number of countries was quite severe and so the decision was made to drop this variable from the subsequent analysis.
[13] It should be noted that the common effect has been to see a decline in the average ratio of welfare spending to GDP for each country. The event time dummies are negative and significant.

Table 3: Effect of Trade Liberalisation on Government Expenditures and Revenues: Difference-in-difference regressions.

Regression No.	**11**	**12**	**13**	**14**	**15**	**16**
Dependent Variable	*Welfare Expend.*	*Budget Surplus*	*Distort. Taxation*	*Product. Expend.*	*Total Revenues*	*Total Expend.*
Trade liberalisation indicator	*SW*	*SW*	*SW*	*SW*	*SW*	*SW*
Event Time Period T	-0.490 (2.39)*	1.181 (1.37)	-0.662 (1.77)+	-1.208 (1.45)	-1.484 (0.67)	-2.609 (0.93)
Event Time Period T+1	-0.775 (2.44)*	4.356 (2.68)*	-0.995 (2.08)*	-2.626 (2.58)*	-1.834 (0.79)	-6.030 (1.67)
Liberalisation Effect Period T	**0.568** **(1.96)+**	**0.743** **(0.36)**	**-0.529** **(0.53)**	**-1.301** **(0.76)**	**-2.104** **(0.59)**	**-0.312** **(0.07)**
Liberalisation Effect Period T+1	**1.053** **(2.73)***	**-0.848** **(0.34)**	**-0.821** **(0.58)**	**-0.724** **(0.37)**	**-0.737** **(0.20)**	**-0.035** **(0.01)**
Constant	2.343 (17.61)**	-6.366 (6.46)**	7.441 (13.12)**	15.730 (18.11)**	24.250 (19.47)**	30.535 (15.20)**
Observations	47	48	49	47	49	48
R-squared	0.99	0.56	0.93	0.91	0.88	0.89

All regressions include fixed country effects.
Robust t-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Kneller et al. (1999) stress the importance of accounting for the government budget constraint when estimating the growth effects of fiscal policy. The authors show that the interpretation of the coefficients from a regression that includes fiscal policy variables depends in part upon which fiscal variables have been omitted from the estimated equation. For example, were welfare spending alone to be included in the estimated equation then the coefficient on this variable would provide information as to its effect on GDP growth conditional on changes in the omitted elements of the budget constraint (which include the budget surplus, productive expenditures and distortionary taxation). Kneller et al. (1999) follow the predictions of the Barro (1990) model and omit instead those fiscal categories predicted by the theory to have no effect on growth. For this reason we include distortionary taxation, the budget surplus and productive expenditure variables rather than welfare spending in regression 18. [14] Following Rodrik (1998) a measure of the level of

[14] Note that in Barro (1990) social security expenditures are predicted to have a zero impact on growth because they are hypothesised to enter the utility function but not the production function. Some overlapping generations models however can predict a negative impact of social security expenditures (such as old age pensions) on long-run growth if these reduce the current level of private savings.

openness to international trade is also included in the regressions that include fiscal variables. The degree of openness is measured as the ratio of exports plus imports to GDP. The results are robust to the omission of this variable.

The results presented in Table 4 test whether changes in fiscal policy mask the effects of trade liberalisation by adding various fiscal variables to the GDP growth regression. Unfortunately the fiscal data necessary to apply these tests is more limited than those of the indicators of trade liberalisation, although as shown regression 17 the reduction in sample size has no significant impact upon any previous conclusions. In regression 18 the inclusion of the fiscal indicators has no impact on the significance of the trade liberalisation indicators. The average growth rate in the periods after trade liberalisation is not statistically different to the period before liberalisation using a difference-in-difference approach. We can conclude from this that the effects of trade liberalisation are not masked by changes in welfare spending. The fiscal variables are themselves reasonably signed and in the case of the budget surplus and productive expenditure significant at (or very close to) standard statistical levels (the latter is significant at the 10.1 per cent level). Interestingly the magnitude of the coefficient on the fiscal variables are very similar to those estimated in Kneller et al. (1999) and Bleaney et al. (2001) for a sample of OECD countries.

Given the lack of evidence of a causal relationship between trade liberalisation and economic growth in Table 2 and the lack evidence of a correlation between changes in fiscal policy and trade liberalisation (outside of that for welfare spending) in Table 3 it would appear unlikely that the results for fiscal policy from regression 18 are generated out of an endogeneity bias. In regression 19 we consider this possibility however using an Instrumental Variable regression.[15] While this is found to have an impact on the significance of the fiscal variables it has no effect on the results for trade liberalisation. Liberalisation does not appear to be associated with faster growth in the medium to long-term.

[15] The instruments variables used are those suggested by the public choice literature on the determinants of government expenditure (see for example Persson & Tabellini, 1999) and include the size and the mix of the population, country size, ethnic diversity and the level of GDP. A Hausman test indicates that OLS is a consistent estimator for this equation.

Table 4: Effect of Trade Liberalisation on GDP Growth: Difference-in-difference and controlling for fiscal variables

Regression No.	**17**	**18**	**19**
Dependent Variable	*GDP growth 5-year average*	*GDP growth 5-year average*	*GDP growth 5-year average*
Trade liberalisation indicator	*SW liberalisers with fiscal data*	*SW*	*SW IV regression*
Openness		0.157 (2.59)*	0.167 (1.67)
Productive Expenditure		0.404 (1.72)	0.986 (1.50)
Distortionary Taxation		-0.299 (0.93)	-0.824 (0.96)
Budget Surplus		0.316 (2.07)+	0.643 (1.49)
Event Time Period T	-1.556 (1.21)	-0.482 (0.34)	-0.633 (0.36)
Event Time Period T+1	-1.375 (0.85)	-1.664 (0.90)	-2.390 (1.00)
Liberalisation Effect Period T	**1.384** **(0.89)**	**-0.006** **(0.00)**	**0.349** **(0.18)**
Liberalisation Effect Period T+1	**1.278** **(0.65)**	**0.286** **(0.15)**	**0.830** **(0.35)**
Liberalisation Dummy			-15.560
			(1.54)
Constant	0.877 (1.49)	-9.160 (2.28)*	-17.816 (1.84)+
Observations	54	47	47
R-squared	0.47	0.72	0.63

All regressions include fixed country effects.
Robust t-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

4: Summary and Conclusions

In this paper we test whether the effects of trade liberalisation on growth are offset by the effect of changes in fiscal policy. The answer would appear to be that it does not.

Using a difference-in-difference approach on a sample of developed countries that liberalised their trade policy we find the growth rate in the period before liberalisation is not statistically different from the period after liberalisation. This result is striking when it is considered that Rodrik & Rodriguez (2000) find that the measure of trade liberalisation

used in this study, that of Sachs & Warner (1995), tends to find the effect of trade reform on GDP growth to be positive and significant. [16] These results are robust to changes in the SW trade liberalisation indicator and the use of an alternative indicator of trade liberalisation by Dean et al. (1994).

These findings question the conventional wisdom amongst empirical researchers and policy practitioners that trade liberalisation causes countries to growth faster. While a strong policy conclusion we cannot rule out the possibility that the results are specific to the choice of relatively low-income developing countries used in the study. These countries might be reasonably thought to be far behind the technical frontier and have low levels of absorptive capacity. Miller & Upadhyay (2000) provide some empirical evidence which suggests the impact of trade liberalisation on growth may be small if a certain level of human capital is required to help the absorption of technology transferred through international trade. Howitt & Mayer-Foulkes (2002) develop a theoretical model consistent with this view. For this reason we conclude instead that trade liberalisation may be a necessary, but not a sufficient, condition for development.

While trade liberalisation has no direct effect on growth we do find evidence to suggest it may have indirect effects through changes in fiscal policy. Of the various fiscal variables used, trade liberalisation is found to affect social security and welfare spending, again using a difference-in-difference approach, but not other measures of fiscal expenditures and revenues. This evidence is consistent with the predictions of Rodrik (1998) and Cameron (1978). The lack of significance of the trade liberalisation indicators in regressions for the other fiscal indicators suggests that countries use various means of financing changes in social security expenditure. For this reason we might expect the indirect growth effect of trade liberalisation to differ across countries and therefore have the potential to explain the lack of significance of the liberalisation/growth results.

While the fiscal indicators enter the regression of GDP growth with the expected signs the trade liberalisation indicators remain insignificant. Trade liberalisation has an indirect effect on the growth rate, through changes in fiscal policy, but no direct effect. While the

[16] The results also do not rule out the possible short-term impact of trade reform on economic growth identified in Greenaway et al. (2002).

results in this paper suggest that changes in fiscal policy cannot help to explain the non-robust relationship between trade liberalisation and GDP growth found elsewhere in the literature, they do suggest that consideration of the possible indirect effects of policy changes on economic growth is important when designing future development strategies.

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Appendix A: Indicators of trade liberalisation, date of liberalisation and which regressions they are used in.

Table A1: Liberalising Countries From Sachs & Warner (1995), date of liberalisation and which regressions used in.

Country	Year	1	3	4	5	6-8	9	11-19
Argentina	1991	*X*			*X*	*X*	*X*	*X*
Benin	1990	*X*			*X*	*X*	*X*	
Bolivia	1985	*X*		*X*		*X*	*X*	*X*
Botswana	1979	*X*						
Brazil	1991	*X*			*X*	*X*	*X*	*X*
Cameroon	1993	*X*			*X*	*X*	*X*	*X*
Chile	1976	*X*						
Colombia	1991	*X*	*X*		*X*	*X*	*X*	*X*
Costa Rica	1986	*X*	*X*	*X*		*X*		*X*
Ecuador	1991	*X*	*X*		*X*	*X*	*X*	
El Salvador	1989	*X*		*X*		*X*		
Gambia	1985	*X*		*X*		*X*	*X*	*X*
Ghana	1985	*X*	*X*	*X*		*X*	*X*	
Guatemala	1988	*X*	*X*	*X*		*X*	*X*	
Guinea	1986	*X*		*X*		*X*	*X*	
Guinea-Bissau	1987	*X*		*X*		*X*		*X*
Guyana	1988	*X*		*X*		*X*	*X*	
Honduras	1991	*X*	*X*		*X*	*X*		
India	1994	*X*	*X*		*X*	*X*	*X*	*X*
Israel	1985	*X*		*X*		*X*	*X*	*X*
Jamaica	1988	*X*		*X*		*X*		
Kenya	1993	*X*			*X*	*X*	*X*	
Mali	1988	*X*		*X*		*X*	*X*	*X*
Mexico	1986	*X*		*X*		*X*	*X*	*X*
Morocco	1984	*X*	*X*	*X*		*X*		*X*
Nepal	1991	*X*			*X*	*X*	*X*	*X*
Nicaragua	1991	*X*	*X*		*X*	*X*	*X*	
Paraguay	1991	*X*	*X*		*X*	*X*		*X*
Peru	1991	*X*	*X*		*X*	*X*		
Philippines	1988	*X*	*X*	*X*		*X*	*X*	
South Africa	1991	*X*			*X*	*X*	*X*	*X*
Sri Lanka	1991	*X*			*X*	*X*		*X*
Tunisia	1989	*X*	*X*	*X*		*X*		*X*
Turkey	1989	*X*	*X*	*X*		*X*		*X*
Uganda	1988	*X*		*X*		*X*	*X*	
Uruguay	1990	*X*			*X*	*X*		*X*
Zambia	1993	*X*			*X*	*X*	*X*	

Table A2: Liberalising Countries From Dean et al. (1994) and date of liberalisation and which regressions used in.

Country	Year	2, 10
Argentina	1989	*X*
Brazil	1987	*X*
Cameroon	1989	*X*
Chile	1985	*X*
Colombia	1985	*X*
Costa Rica	1985	*X*
Ghana	1987	*X*
Indonesia	1986	*X*
Kenya	1988	*X*
Korea, Rep	1987	*X*
Malawi	1988	*X*
Malaysia	1988	*X*
Pakistan	1988	*X*
Peru	1989	*X*
Philippines	1986	*X*
Senegal	1986	*X*
South Africa	1990	*X*
Sri Lanka	1987	*X*
Thailand	1989	*X*
Venezuela	1989	*X*

Table A3: Non-liberalising Countries from Sachs & Warner (1995) and which regressions used in.

Country	6-8	9	10	11-19
Algeria	*X*	*X*	*X*	
Angola				
Bangladesh				
Burkina Faso			*X*	
Burundi	*X*	*X*		*X*
Central African Republic				
Chad				
China	*X*	*X*	*X*	
Congo	*X*			
Cote d'Ivoire	*X*	*X*	*X*	
Dominican Republic	*X*			*X*
Egypt	*X*		*X*	*X*
Ethiopia				
Gabon	*X*	*X*		
Haiti			*X*	*X*
Iran	*X*		*X*	*X*
Iraq	*X*		*X*	
Madagascar				
Malawi				
Mauritania	*X*	*X*	*X*	
Mozambique	*X*	*X*		
Myanmar				*X*
Niger				
Nigeria	*X*			
Pakistan	*X*			
Papua New Guinea	*X*	*X*	*X*	
Rwanda	*X*	*X*		
Senegal	*X*	*X*		
Sierra Leone				

Somalia				
Syrian Arab Republic	*X*	*X*	*X*	*X*
Tanzania	*X*	*X*		
Togo	*X*	*X*		*X*
Zaire				
Zimbabwe	*X*	*X*	*X*	

Appendix B: Data

Table B1: Summary Statistics

Variable	**Sub-sample of countries**	**Mean**	**Standard deviation**	**Number of obs.**
GDP growth (5yr average)	*SW open*	1.07	3.47	222
	DDR open	2.07	2.90	120
	SW closed	0.55	3.87	181
	SW open with fiscal data	1.48	2.68	110
Social Security and Welfare Expenditure	*SW open*	3.25	4.17	88
	SW closed	1.34	1.24	53
Total Fiscal Expenditure	*SW open*	28.50	15.33	102
	SW closed	25.49	11.69	68

Fiscal Data

A key issue is the allocation of taxes and expenditures respectively to distortionary/non-distortionary and productive/non-productive categories. Whilst all major taxes are distortionary in some respect distrotionary, in testing endogenous growth models the relevant distortion is that on growth. Following Barro (1990), we treat income and property taxes as 'distortionary' and consumption (expenditure-based) taxes as 'non-distortionary', on the grounds that the latter do not reduce the returns to investment, even though they may affect the labour/leisure choice. Of course, in more sophisticated models consumption taxes do distort the decision to invest (indirectly) to the extent that they affect the labour-education-leisure choices of agents. In allocating expenditures to productive/non-productive categories we generally follow Barro and Sala-i-Martin (1995) and Devarajan et al. (1996) and treat expenditures with a substantial (physical or human) capital component as 'productive'.

Table B2: Theoretical Aggregation of Functional Classifications

Theoretical Classification	Functional Classification
distortionary taxation	taxation on income and profit social security contributions taxation on payroll and manpower taxation on property
non-distortionary taxation	taxation on domestic goods and services
productive expenditures	general public services expenditure defence expenditure educational expenditure health expenditure housing expenditure transport and communication expenditure