The link between financial development and sectoral output growth:

Evidence from Sri Lanka

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Abstract

In recent years the economies in South Asia have experienced remarkably high growth rates of domestic output. However, growth in many cases has been uneven across sectors. While in particular services and construction have been expanding, manufacturing and agriculture have been growing much more slowly. In this paper we empirically evaluate this asymmetry across sectors in a historical data from Sri Lanka, starting in the 1970ies. Our main finding is that tradables and non-tradables goods producing sector react quite differently to changes in domestic credit. We point out that in this respect Sri Lanka is reminiscent of a very broad cross section of middle income countries, where the same stylized fact has been observed. We explain our findings in the context of a 2-sector growth model of Tornell and Schneider (2004). We argue that Sri Lanka shares important features of countries that have grown through a process of boom-bust cycles after financial liberalization.

Keywords: Financial Development; growth; agriculture; poverty

JEL codes: O11, O16, O53, F41

1. Introduction

A remarkable feature of the recent period of solid growth in South Asia is that growth has been uneven across sectors. While in particular the services, transport and construction sectors were able to expand, the manufacturing and agricultural sectors were growing more slowly in the 2000s. At the same time, the financial systems have been gradually deregulated and domestic credit has been expanding.

This asymmetric growth pattern is quite common for emerging economies in general, but it is particularly pronounced in South Asia (See Eichengreen and Gupta (2009)). The main objective of this paper is to contribute to the understanding of this stylized fact, in a theory-based empirical analysis and to compare the growth patterns in Sri Lanka to other countries in a period of financial liberalization.

This question is of particular relevance for the economy of Sri Lanka. Since the recent end of the conflict period in Sri Lanka, domestic credit has started to expand quite rapidly. The analysis of output responses to expansions in domestic credit at the sectoral level, thus may serve as a reference for the chances and risks for long run growth that are associated with this process.

Concretely, we use long time series on sectoral output data, starting in the 1970ies in Sri Lanka, and identify the impact of domestic credit expansions on the various sectors in the economy, using a vector-auto-regression (VAR) model that was developed by Tornell and Westermann (2005). The impulse response patterns provide information on the strength and timing of the respective sectoral output reaction to changes in domestic lending.

Our main empirical finding is a sharp asymmetry across sectors in the economy. While sectors producing non-traded goods display a strong reaction of output to an unexpected change in domestic credit, the sectors producing non-traded goods display insignificant reactions, sometimes close to zero. Rather non-tradeable in our interpretation are the construction, services and telecommunications sectors. Also effectively non-traded – due to trade barriers like tariffs and quotas is the output in the agricultural sector. Quite tradeable on the other hand, is the output produced in the manufacturing and mining sector.

A two sector-growth model, originally developed by Schneider and Tornell (2004), where credit constraints, bank lending and the real exchange rate play a role help to interpret the empirical findings. In the past 20 to 30 years, many middle income countries have liberalized their financial markets and experience boom-bust cycles patterns in domestic output that was also associated with sharp sectoral asymmetries. Key to this process was that firms – particularly in the non-traded sector - denominated their debt in foreign currency, in order to overcome their credit constraints. In this setting, changes in the real exchange rate have

generated the following balance sheet effects: When there was a real appreciation, the value of the debt of the firms declined, and they were able to borrow and invest more, thus contributing to a boom-period. Vice versa, when the exchange depreciated, the value of the debt increased and, in some case, a large depreciation triggered a major bust of the economy, most prominently in the 1994/5 crisis in Latin America and 1997 in South-east Asia.

While still a mostly closed economy regarding its financial sector, Sri Lanka also shares some of the characteristics of countries that have experienced such patters after financial liberalization. First, Sri Lanka is in the range of middle income countries that are in the process of establishing institutions and legal systems, but also presently still face some contract enforceability problems, that are typically seen as a key factor for the firms' decisions to denominate debt-contracts in foreign currency (See Tornell, Westermann and Martinez (2003)).

Second, there are asymmetric financing opportunities across sectors[1]. We use a firm-level database of the World bank in order to show that the non-traded sectors are financing themselves mostly via the domestic banking system, while the traded sectors, in particular the manufacturing sectors have other sources of financing available, such as the domestic capital market where they can issue bonds and equity, or the international capital market, where they can attract for instance foreign direct investment. This asymmetry in financing opportunities is used to explain the difference in the strength of the reactions of sectoral output to unexpected changes in domestic lending in the VARs.

Third, the banking system in Sri Lanka is also characterized by a partial foreign currency denomination of its aggregate balance sheet. Unlike countries in Southeast Asia and Latina America, this is not yet due to large international capital inflows. But a steady stream of remittances from abroad has led to approximately 15% of total liabilities that, according to world bank estimates, is denominated in foreign currency.

The analysis of sectoral output growth rates helps to better understand the link between financial development and the goal of poverty alleviation: In most countries, the largest part of the population is employed on non-tradeables goods producing sectors, such as services and agriculture. The policy implication that follows from our analysis is that aggregate GDP – the most common indicator of a countries welfare – is masking a deeper asymmetric pattern. Both, in periods of output expansions and contractions, it is important to monitor the output in individual sectors. Specifically, in the aftermath of financial contractions it often happens that

[1] The distinction between tradables and non-tradables good producing firms is also reminiscent of the distinction between formal and informal sector firms that has recently been analyzed for Sri Lanka by De Mel, McKenzie and Woodruff (2012).

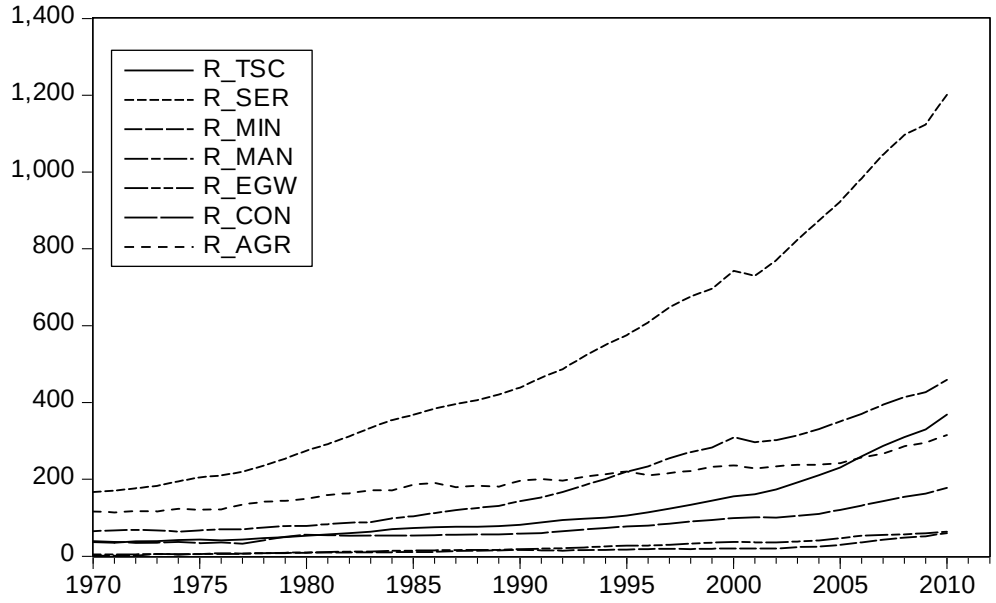
non-traded sector experience a much deeper and more sustained recession that the tradable goods producing sectors.

2. The data

The data for this research project are mostly taken from the national statistical office of Sri Lanka. Sectoral output that exists in various publications of the Sri Lankan statistical office are connected and re-based for this research paper to generate a long time series, starting from 1970 onwards. The frequency of the data is annual, although for the past few years, there also exist sectoral output data at the quarterly frequency. The quarterly series, however, is to short too conduct a time series analysis.

Figure 1 displays the key time series of sectoral output in constant prices in Sri Lanka. From looking at the data, one can already see some interesting pattern regarding the long run trends. For instance the Services sector that – like in many South Asian economies – has grown substantially over the past decades, particularly over the last 10 years. Today, Services constitutes by far the largest sector in Sri Lanka. In the beginning of the sample, until the early 1990ies, the agricultural sector was the second largest sector. Among all sector, it has been characterized by the smallest long run growth rates and today only ranks 4th with regard to its size. The manufacturing sector has become the second most important sector of the economy in 1995, and is one of the most strongly growing sectors, because it started from a rather low base in the 1960ies. More recently, after 2005, also the Telecommunication services and computer industry has by-passed the formerly more important agricultural sector and now ranks third with regard to its contribution to domestic output.

Figure 1: Output of sector in constant prices



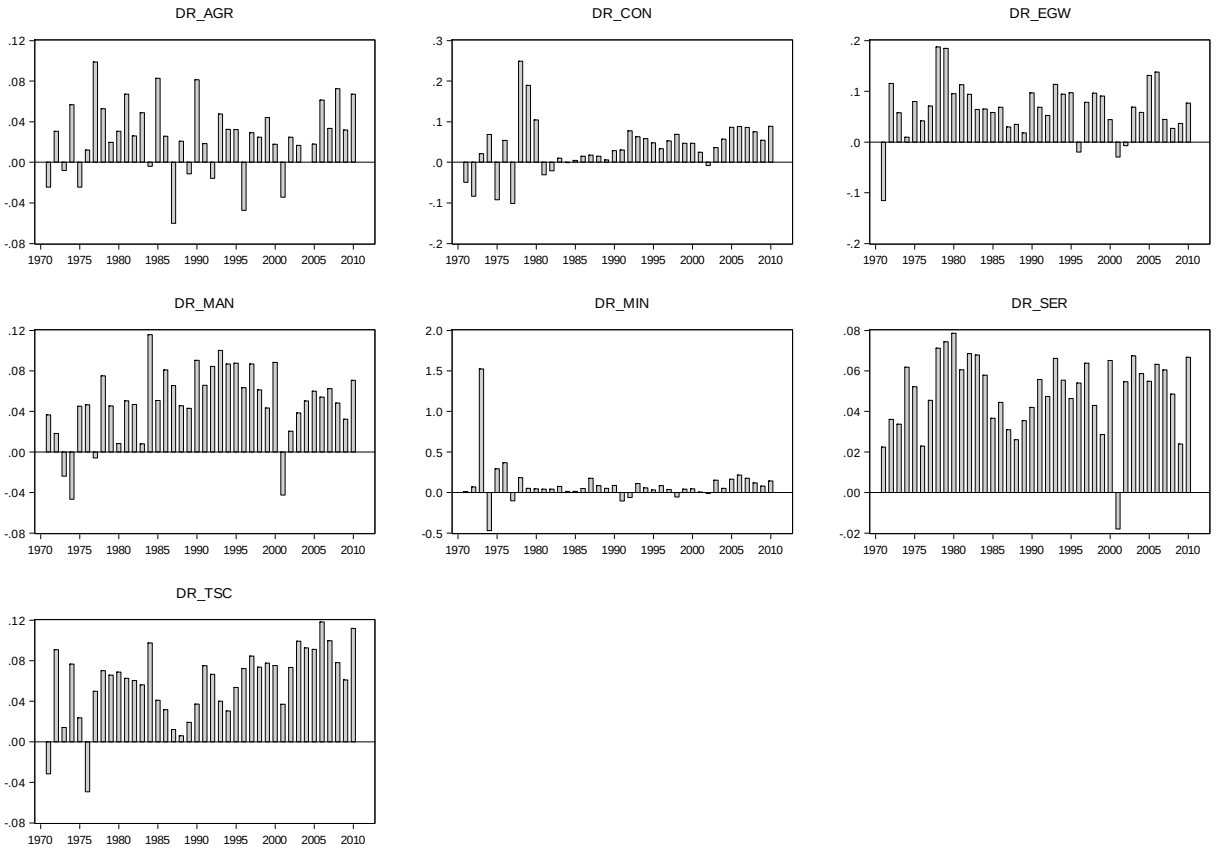
Note: “R” denotes real output. TSC=Telecommunications and comuter services, SER= Other services, MIN=Mining, MAN=Manufacturing, EGW=Electricity-Gas-Water, CON=Construction, AGR= Agriculture.

When taking the logged first differences of the data, we get approximately the year-on-year annual growth rates of sectoral output. These real growth rates are displayed in Figure 2. Taking this perspective one can see, more clearly than in levels, that there have been large fluctuations in the development of output over the past 40 years. Clearly some of the individual observations are also linked to the historical events of the country after reaching independence .

The upper left panel shows the output in the agricultural sector, whose output appears to fluctuate more randomly than in other sectors. This seems plausible, as aside from economic and political factors, the weather conditions and the opportunity to harvest the output are clearly important exogenous factor that determine the magnitude of production. The Construction sector appears to develop more smoothly, although the variance is larger during the first 10 years. It cannot entirely be ruled out, that this initially larger variance that is also visible in the Mining sector in particular, is due to differences in the recording of output in the national statistics. Robustness tests on shorter subsamples will therefore have to be an important part of the sensitivity analysis. Another visible regularity that also appears in other sector is the negative growth rate in 2001. Clearly this contraction that occurred in all sectors, except TSC, is related to the political conflict of the countries during this time. In fact, the entire period after 1982 needs to be considered against the background of political and partly violent turmoil that the country was struggling with while at the same time experiencing a

partly rapid, but certainly profound and substantial development and restructuring of its economy. Towards the end of the paper we will separately take a look at the past two year, after the end of the conflict period, where some variables, including domestic credit experienced steep increases. Coming back to the growth rates of output data, it is remarkable, that despite these circumstances, the services sector as well as manufacturing and Telecommunication had relatively stable and positive output growth rates over the longer term.

Figure 2: Real output growth rates



Note: “DR” denotes the first logged differences of the variables displayed in figure 1.

Figure 3a below shows that domestic credit (again in real terms) has also been quit e volatile. A large contraction occurred in 1991 and a round in the following year and up the mid-1990ies. Panel b of the same figure shows that despite these volatilities, there has been a process of financial deepening in Sri Lanka. From values of about 6-7% of GDP the domestic credit provided to the private sector, by domestic money banks has increased to more than 30% by the year 2010. In the more recent time period, the expansion of domestic

credit, visible in recent quarterly data, has taken place even more rapidly. The corresponding credit-to-GDP ratio is displayed in figure 3b.

Figure 3a: Real credit growth rates

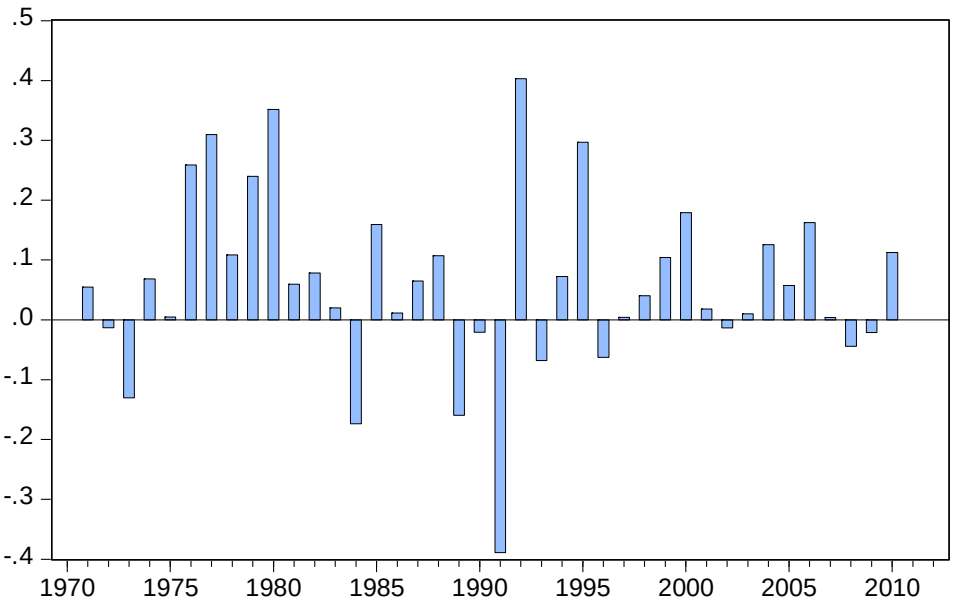
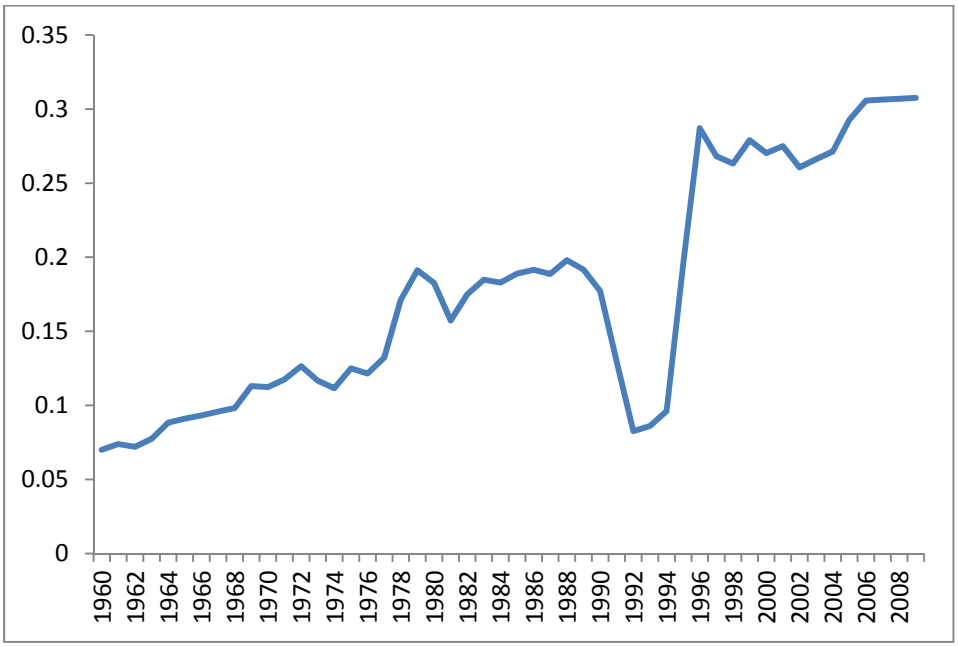


Figure 3b: Domestic credit relative to GDP



Source: Financial structure database, World Bank and International Financial Statistics, IFS.

3. Preliminary analysis

In this section, we start with the preliminary analysis of the data, with regard to its unit-root and cointegration properties. In the later sections, we will investigate the empirical relationship between domestic credit provided by banks and the sector specific output in a vector-autogression analysis. To avoid a spurious specification, the information about stationary and long run co-movement among the variables is therefore essential.

We start by implanting the augmented Dickey-Fuller Test. Table 1 displays the results for the test on the levels as well as the first differences of the data. In all regressions, we include a constant, and a number of lagged values that is indicated by the SIC criterion. The left panel of the table, displaying the unit root tests in levels, shows that all variables – the sector specific real output series as well as real domestic credit – are characterized by a unit –root and are therefore treated as non-stationary in the subsequent analysis. In none of the cases, the null hypothesis of a unit root can be rejected. The right panel of the table displays the same tests for the 1st differences of the data. Here the evidence is also clear cut. After taking logged differences, we can reject the null hypothesis of a unit root in all case. In the case of the construction sector, the evidence is somewhat weaker as in other sector, as we can reject the unit root only at the 10%-level, with a P-value of 0.0513. In all other cases the unit root can be rejected at the one percent level. In the subsequent analysis, we therefore treat the data as difference-stationary.

Table 1: Unit root tests

	Levels			1st Differences	
	Test stat.	P-value		Test stat.	P-value
AGR	1.67	0.99		-6.79	0.00
CON	2.87	1.00		-2.93	0.05
EGW	3.37	1.00		-5.90	0.00
MAN	5.47	1.00		-4.62	0.00
MIN	5.48	1.00		-8.53	0.00
SER	7.53	1.00		-5.30	0.00
TSC	15.83	1.00		-4.69	0.00
Credit	0.43	0.98		-6.53	0.00

In the next step, we investigate whether there exist long-run co-movements among the variables that need to be taken into account when specifying the VAR system. As in the VAR analysis, we limit the exercise to the same bi-variate combinations of variables that will be used later on in the analysis. As a first cointegration-text, we implement the Engle-Granger 2-

step approach, where in a first state, we regress variables on each other and in a second step, we implement a unit root test on the residuals of that regression. In principle, the results could differ, depending on which variable was chosen as depended variable in this setup, and we therefore report two test-statistics for each pair of variables under investigation, using a different depended variable each time. In the unit root tests of the second step, we used the same ADF test specification that was already discussed above.

As Table 2 shows, we cannot reject the null hypothesis of a unit root in the residuals of the second regression in any of the cases. Regardless of whether the real domestic credit variable, or the sector-specific variable is chose to be the dependent variable, the residual of the regression always contains a unit root and the bi-variate pairs of output and credit therefore do not seem to be co-integrated.

We investigate the rustiness of this initial finding by also applying the Johansen cointegration procedure. The Johansen procedure, unlike the Engle-Granger two-step approach, is designed to multivariate data sets. Nevertheless, it can also be applied to a bi-variate pair of time series, as we have done in Table 3. It is based on a conical correlation analysis and can this be interpreted as a multivariate unit root test, which investigates how many independent stochastic trends are share by a given set of variables. Table 3 show that the finding is a bit less clear cut that in the previous tables. While most sectors do not display a cointegrating relationship with domestic credit, including the agricultural sector, construction the electricity-gas-water sector and the mining sector, there is some evidence of cointegration in the sector of Telecommunication and computer services. There the null hypothesis of a no cointegration can be rejected, while the null of at most one cointegration vector can be rejected at the one percent level. This would imply that the two series are indeed cointegrated. In the later analysis we therefore implement a vector-error correction model as a robustness test for this sector. There are also some puzzles. For manufacturing and services, both nulls are rejected. As these sector where clearly documented to have a unit root above, we take this as an artifact of the Johansen procedure, rather than an indicator of a true long run relationship. This artifact could be explained by the relatively small size of the sample. When using for instance the finite sample critical values by Cheung and Lai (1995) the p-values would be higher and come close to insignificance.

Table 2: Engle-Granger Cointegration tests

	Dependent Variable	tau-statistic	Prob.*	z-statistic	Prob.*
AGR	RCR	-2.35	0.35	-10.02	0.31
	R_AGR	-2.25	0.40	-9.54	0.34
CON	RCR	-2.33	0.36	-10.68	0.27
	R_CON	-1.83	0.61	-8.757	0.39
EGW	RCR	-2.62	0.24	-11.74	0.21
	R_EGW	-2.37	0.35	-10.60	0.27
MAN	RCR	-2.25	0.40	-8.61	0.41
	R_MAN	-2.00	0.53	-7.42	0.50
MIN	RCR	-1.36	0.81	-5.26	0.69
	R_MIN	-0.47	0.96	-2.01	0.93
SER	RCR	-2.82	0.17	-13.54	0.14
	R_SER	-2.63	0.24	-12.53	0.18
TSC	RCR	-1.89	0.58	-7.55	0.49
	R_TSC	-1.20	0.85	-4.98	0.71

For the following VAR analysis, we therefore make the benchmark assumption that the data are difference stationary and not cointegrated. For none of the sectors we found robust evidence of cointegration, in the sense that both procedures were able to reject the null of no cointegration. For some sector – TSC, MAN and SER – we will perform a VECM test as a further robustness test.

Table 3: Johansson Cointegration tests

			Trace	0.05	
		Eigenvalue	Statistic	Critical Value	Prob.**
AGR	None	0.21	12.29	15.49	0.14
	At most 1	0.06	2.68	3.84	0.10
CON	None	0.19	12.62	15.49	0.12
	At most 1 *	0.10	4.24	3.84	0.03
EGW	None	0.18	10.63	15.49	0.23
	At most 1	0.06	2.69	3.84	0.10
MAN	None *	0.26	16.39	15.49	0.03
	At most 1 *	0.10	4.38	3.84	0.03
MIN	None	0.25	11.85	15.49	0.16
	At most 1	0.01	0.18	3.84	0.67
SER	None *	0.44	29.15	15.49	0.00
	At most 1 *	0.15	6.45	3.84	0.01
TSC	None *	0.39	22.34	15.49	0.00
	At most 1	0.06	2.54	3.84	0.11

4. Evidence from Vector-Autoregressions

Having completed the preliminary analysis. We are now ready to move on to the main question addressed in this paper, the empirical link between output and credit at the sectoral level. We use a VAR in first differences for this purpose. We estimate the coefficients of a set of bi-variate VARs by least squares, choosing different lag lengths.. From these VAR coefficients, we that compute the impulse response functions that are displayed below in figure 4. These impulse response functions show the reaction of output in the various sectors to an unanticipated shock in domestic lending. The solid lines display the point estimated and the dotted lines the 95% confidence interval.

In most of the cases, the SIC criterion would suggest and AR(1) or AR(2) process for the data. In order to allow for richer dynamics in the impulse-response pattern, we take a AR(2) process as a benchmark for the interpretation of our results. (An AR(1) is very restrictive and

limits the IRF to a monotonous reaction to the shock). In Figure 4, we also report the results from the specification of an AR(3) model as an additional robustness test.

The computation of impulse response functions require additional assumptions about the contemporaneous co-movements of the variables. The most common identification procedure is that of a Choleski Decomposition. In our case, however there is no natural ordering that would generate a recursive system that is needed for this type of approach. We therefore choose to use the concept of generalized impulse response functions. In this approach, an assumption of the contemporaneous ordering is not needed. However it also has limits that should be discussed. The impulse response patterns displayed in Figure 4 are the responses to a system shock, i.e. a shock of one standard deviation to the variable of interested and at the same time – using the empirical contemporaneous correlation – all other variables. This approach does not need an assumption on the ordering, but it limits the ability to give a structural –causal- interpretation to the findings when the contemporaneous correlation is high. As in our dataset, the later issue is not so severe in most cases, we believe that it is the best specification to use in our analysis.

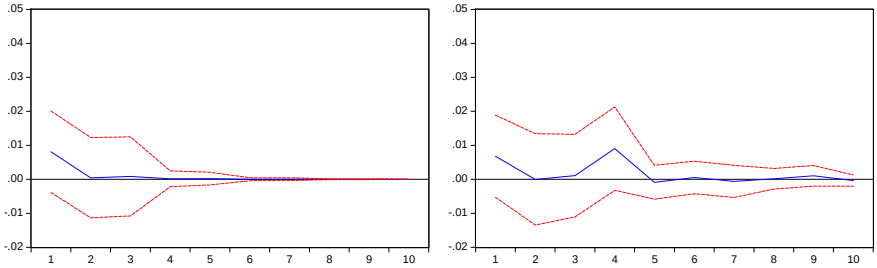
The first impression one get, when looking at Figure 4, is that there is not very much significant reaction of output to unexpected changes in domestic lending. Note, however, that there are still remarkable differences across sectors. The agricultural sector for instance show a positive reaction that is close to significant at the 5% level. At 10% it is indeed statistically significant in the period 1 after the initial shock. The same is the case of Electricity-gas-water and to a lesser extend also construction and services. Note that this sectors are all classical non-tradeables goods producing sectors.

Statistically insignificant and even slightly negative in the 1st period, on the other hand are the reactions of Manufacturing, Mining and Telecommunication and computer services. The manufacturing and mining sectors are the sectors that are typically associated with tradable goods producing firms. In this sense, the evidence for Sri Lanka, is very much consistent with a broad set of middle income countries. Firms in the non-tradabels sectors crucially depend on domestic credit, while firms in the tradables sectors have access to other forms of finance and react less strongly to unexpected changes in the domestic banking system.

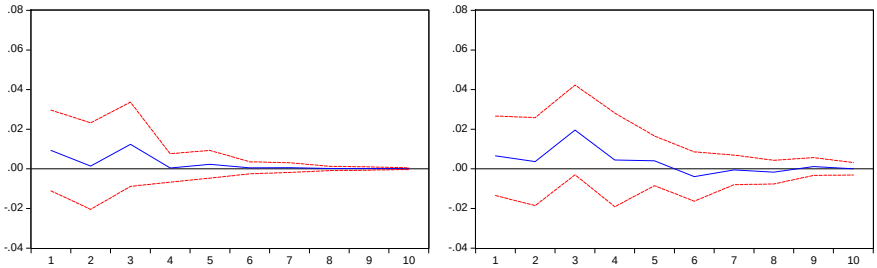
The TSC sector is an exception to this general interpretation. However, although mostly non-tradeable, it is likely that firms in this sectors are rather large, when compared to agriculture, or other services companies. It is therefore plausible, that these firms also have access to other forms of financing in the domestic capital market, such as bond or equity financing, as well as public finances, in the case of the telecommunications industry.

Figure 4: Impulse response functions tracing a one-standard deviation shock in credit on output

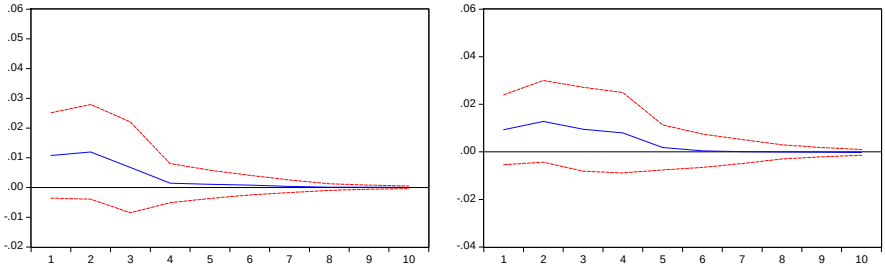
AGR



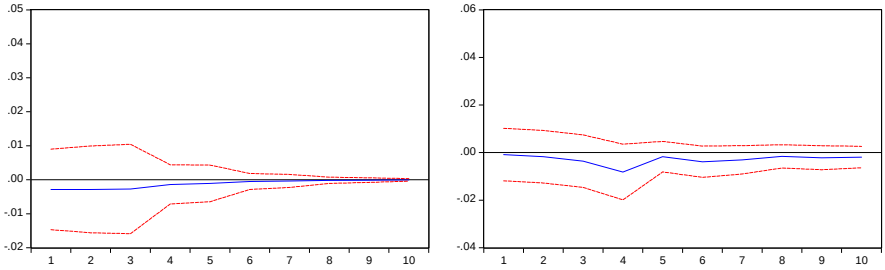
CON



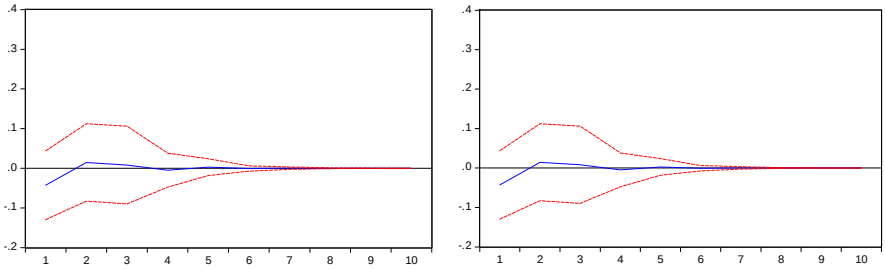
EGW



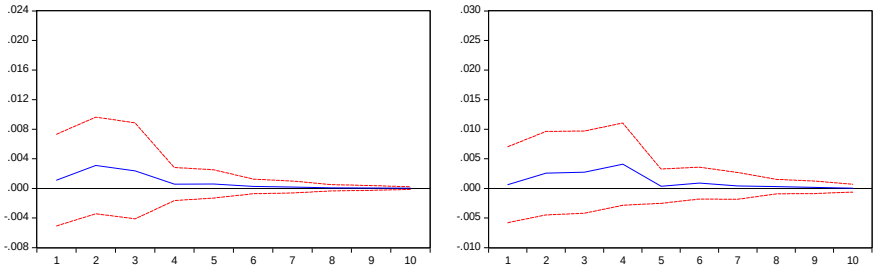
MAN



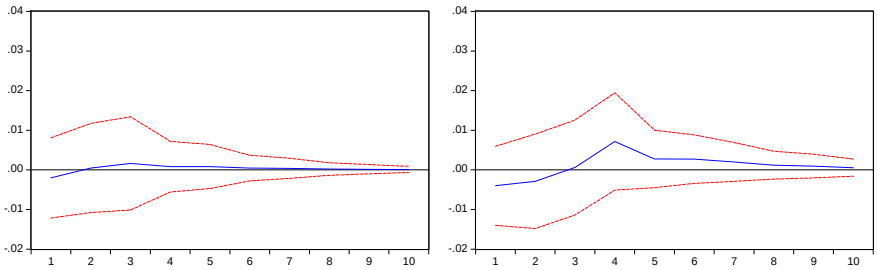
MIN



SER



TSC



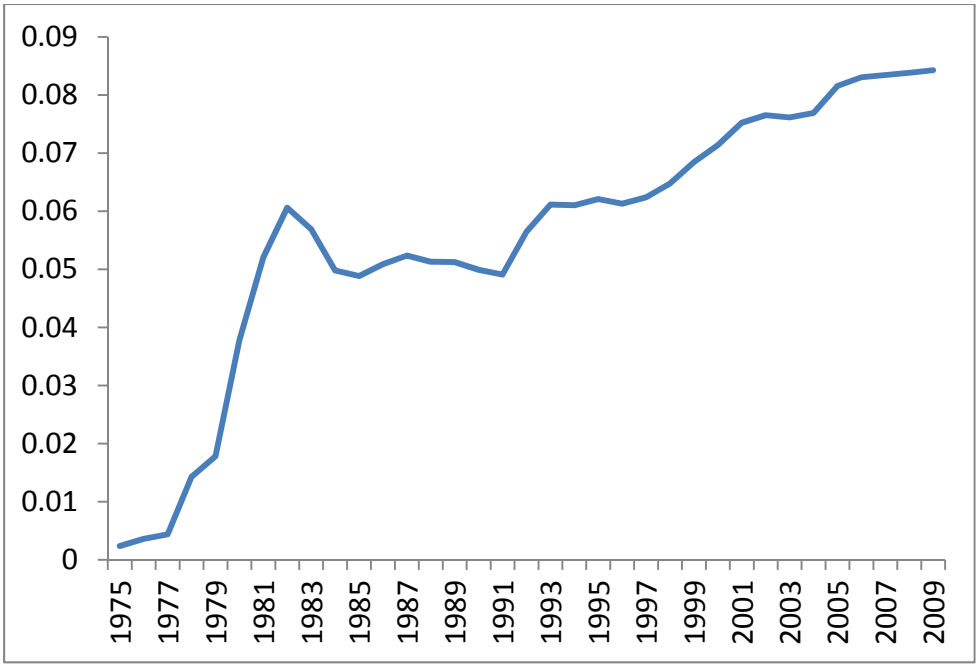
5. A conceptual framework to interpret differences across sectors

In the previous section, we have documented the differences across sectors in their reaction to changes in domestic credit and found results that are consistent with the view that it matters whether a firms are big or small, and whether they operate in tradables or non-tradeables goods producing sectors. This is interesting because the relative price between tradeables and non-tradebale goods – in a simplified model of Schneider and Tornell (2004) – is the same as the real exchange rate.

The reason why the real exchange rate might matter even in a relatively closed economy like Sri Lanka can be seen in Figure 5, below. Figure 5 shows the remittances that are send each year to Sri Lanka by worker who are earning their income abroad. These incomes are send in foreign currency and generate the following mismatch on the balance sheet of the

countries. While the liabilities of the banks are to an increasing extend denominated in foreign currency (the money that workers from abroad have deposited), they keep lending to firms that are operating largely in the national economy and have their incomes in domestic currency.

Figure 5: Remittances as a percentage of GDP

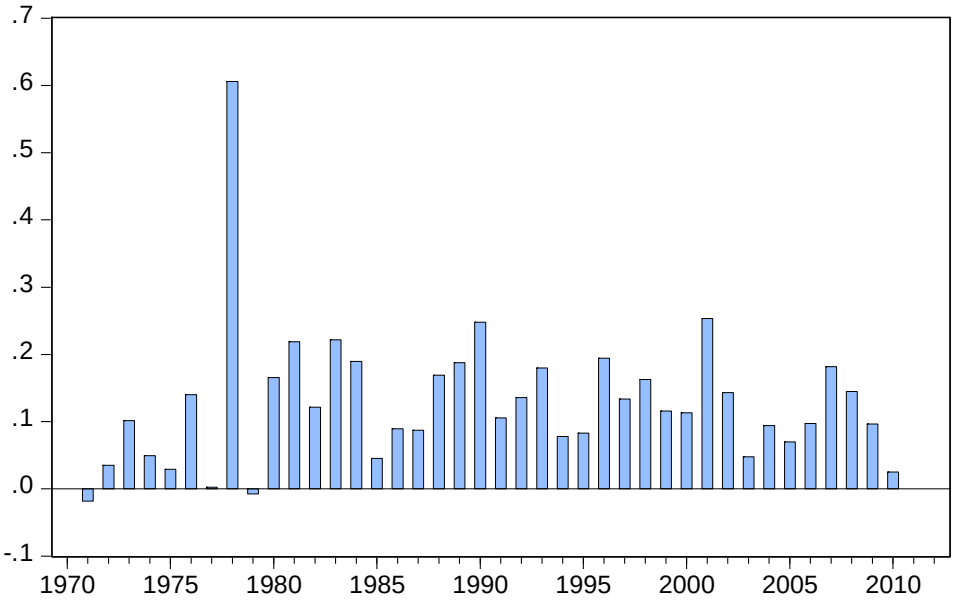


Source: Financial Structure database of World Bank

The balance sheet effect this might produce is the following: if the real exchange rate appreciates, there the value of these foreign currency deposits increases and banks are able lending more, generating a positive effect on the economy. If the exchange rate depreciates, the opposite is the case. A depreciation has a contractionary impact on the real economy, because the domestic banks have less resources to lend.

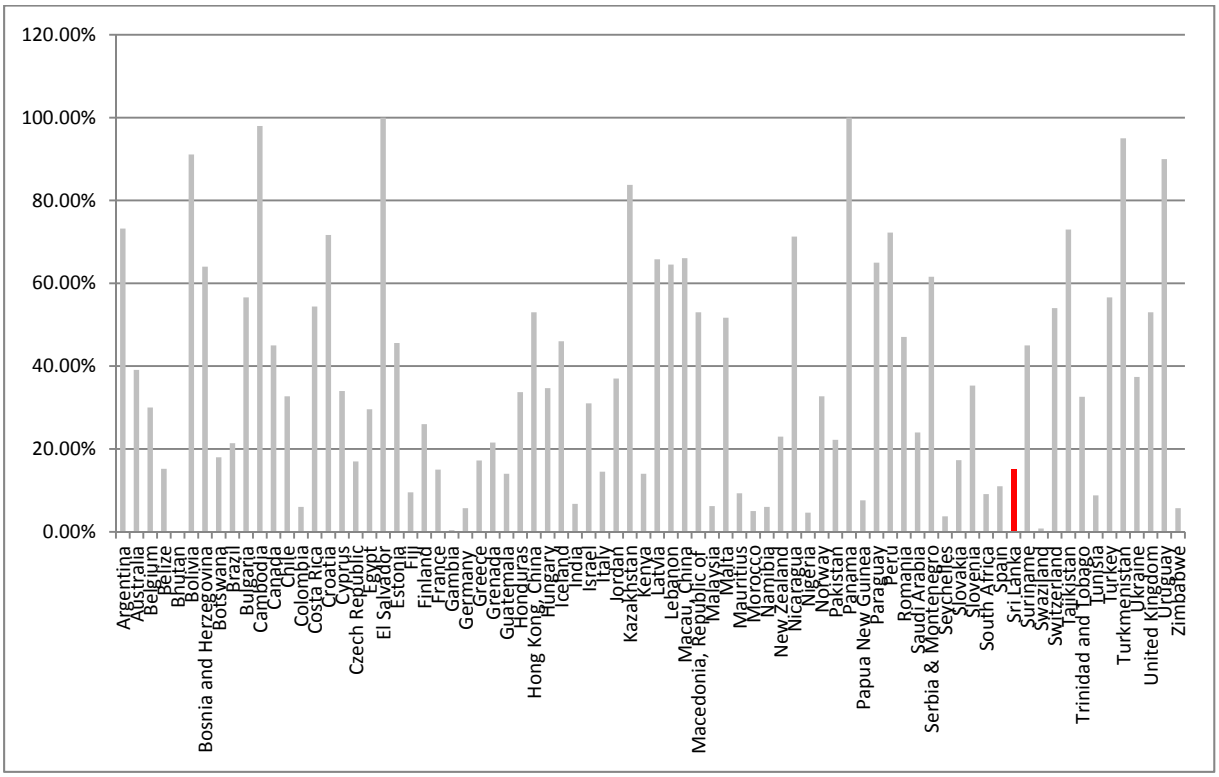
The evolution of the real exchange rate is displayed in Figure 6, which shows that for most of the period under investigation there has been a depreciation of the currency. However, in some years during the 1970ies, there has also been an appreciation. Also in the other years, the depreciation has been of quite different magnitudes. In 1978 and 2001, for instance, there have been particularly large depreciations.

Figure 6: The real exchange rate (logged first differences)



In a large cross section of countries, the foreign currency denomination of total liabilities in the Banking system is not particularly high. Sri Lanka, ranks among the more moderately dollarized economies, with a value of just over 15% of total liabilities. This is much smaller than for instance the highly dollarized economies of Latin America and Southeast Asia during the Asian financial crisis of 1997/8. Nevertheless, we will argue in this section that the share is large enough to generate the balance sheet effects that could lead to an unconventional link between the real exchange rate and real output in the non-traded sectors.

Figure 8: Foreign currency liabilities of the banking system

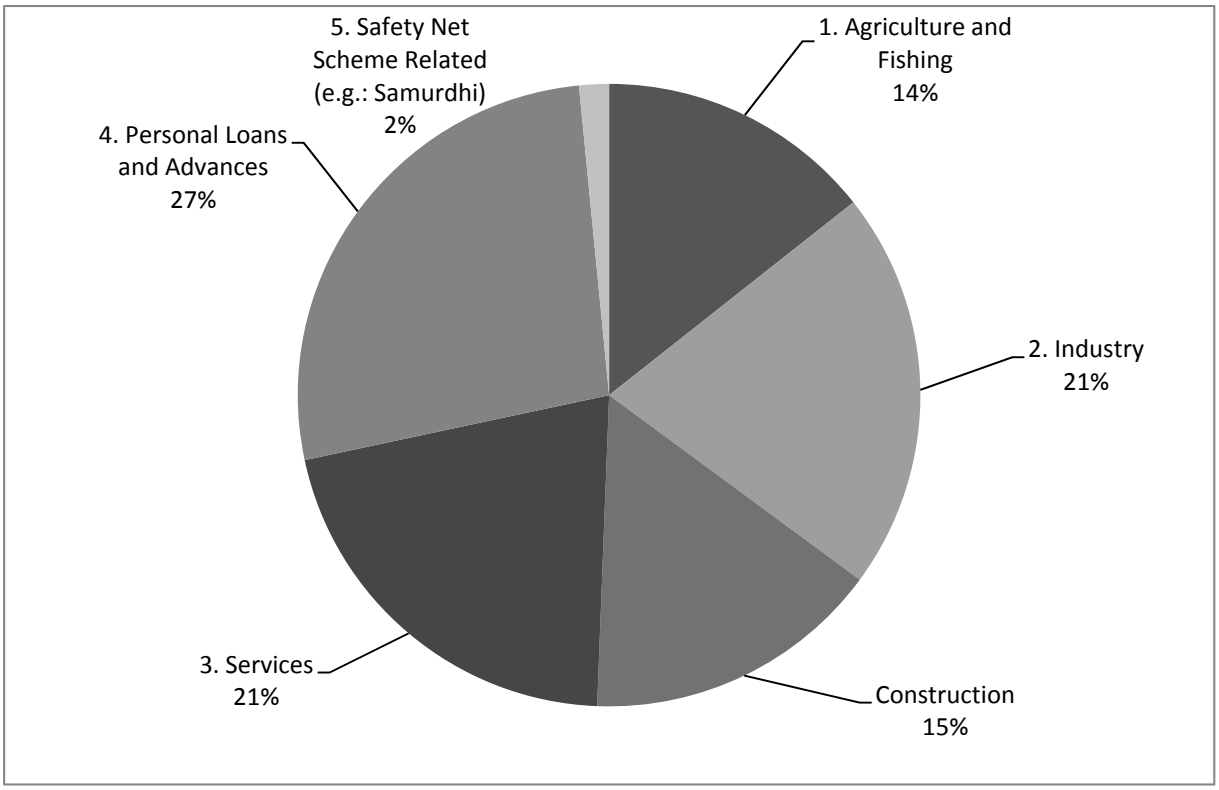


Source: world Bank, banking regulation database.

The phenomenon of “currency mismatch” can take several different forms. In the text-book example, non-traded firms borrow in foreign currency, but have in income in national currency. Changes in the exchange rate therefore trigger balance sheet effect on the firm’s balance sheet. However, currency mismatch can be on the firm side and on the bank side, or it can be an indirect, more subtle combination of both.

In Sri Lanka the link is the following: While banks accumulate foreign currency deposits from remittances, they also lend to the non-traded sectors. Figure 9 shows the sectoral breakdown of lending contracts of the Sri Lankan banking system. As we can see in the figure the largest part of the lending is to non-traded sectors. The Agricultural sector for instance received 14% of the loans, construction 15% and services 21%. Personal loans and advances, with a share of 27%, can be classified largely non-traded as well, in the sense that the private households have their wage income in local currency. Therefore 77% of lending goes to agents that have income in national currency. Among the 21% that goes to the industry, some firms are likely to produce tradables goes, but the rest may or may not have income in foreign currency. A more details breakdown of the sectoral lending is given in Table 1 of the appendix.

Figure 9: Bank lending by sector in Sri Lanka



Source: Central bank of Sri Lanka.

Overall the large exposure of the Sri Lankan banks to the non-traded sector generate the following additional risk to the economy: If there is a large depreciation, the value of the foreign currency liabilities of the banking system increases. As the firms have their revenues in local currency, the banks cannot roll over their losses to their customers. This would be different if the loans were given to the traded sector, whose income would rise in case of a depreciation.

While creating risks on the side of the banking system, this foreign currency liabilities also have clear benefits for the non-traded firms whose credit constraints are relaxed. The non-traded sector is financing itself mainly from the domestic banking. As documented in the first set of VAR results, we see that the impact of lending on growth is particularly strong in the non-traded sectors.

The importance of bank credit for financing investment can also be seen in firms' level data that was collected by the World Bank in a wide cross section of countries, including Sri Lanka. Table 4 displays the responses of the Sri Lankan firms, again broken down by sectors. In this table one can see thank the banks are clearly more important in the non-

traded sectors. In Agriculture 31% of investment is financed by loans from banks, 55% in construction and 37% in services. By contrast on 21% of investment is financed by banks in the manufacturing industry. Manufacturing, that is likely to be the most tradeable sector, has other sources of financing available, such as non-bank financial institutions (5%) and the issuance of equity (6%). Note that for the other sectors, CON and TSC, the number of firms is very small (2 and 4, respectively), and can hardly be seen as representative. Although a relatively small sample, overall, this evidence is consistence with the results observed in a large cross section of other middle income countries (see Tornell and Westermann (2002)).

Table 4: purchase of fixed assets that was financed from each of the following sources (in %):

	AGR	CON	MAN	TSC	SER
Internal funds or retained earnings	53.46	45	57.5	50	46.69
Owners' contribution or issued new equity shares	3.75	0	6.25	0	2.45
Borrowed from banks: private and state-owned	31.06	55	21.71	37.5	37.83
Borrowed from non-bank financial institutions	6.71	0	5.85	0	5.91
Purchases on credit from suppliers and advances from customers	1.09	0	3.51	12.5	2
Other, moneylenders, friends, relatives, bonds, etc.	3.90	0	5.15	0	4.25

Source: World business economic survey- sample of firms from Sri Lanka

Note: the responses refer to the fiscal year 2010/11. In total, 161 firms were asked. 32 Firms from Agriculture, 2 firms from Construction, 64 firms from Manufacturing, 4 firms from Telecommunication and computer services and 59 firms from other services.

Conclusions and imlications for welfare

Non-traded sectors constitue a very large part of the economy. In the final figure 1 of the appendix, below, we se that they contribute the largest share of output. Manufacturing and Mining, typically classified as tradable goods producing sectors account together only for 19% of total output in Sri Lanka. Even larger than these numbners is the share of employment in the non-traded sectors sectors. A sectoral approach to the analysis of lending and growth is therefore very important.

In this paper, we have documented that sectoral asymmetries exist in the Sri Lankan economy. The non-traded sectors dislay a stronger reaction of output growth to unexpected changes in domestic lending and has grown faster than other sectors over the past 30-40 years. Both observations are reminiscant of a broad cross section of middle income countries that share similar characteristics.

In our paper we used a two-sector growth model to exlain this asymmetry. The Non-traded sector are financed mainly via the domestic banking system, while traded sectors have other forms of finance available, such as quity financing in the domestic capital markets, and foreign direct invesment. The stonger reaction of output growth in non-traded sectors to changes in domestic lending therefore seems plausible. Furthermore, Sri Lanka shares features of some of the more dollarized countries. Although it is characterized by a rather closed capital market, a steady stream of remittances has led to a share of foreign currency liabilties about about 15% of total liabilties.

From a welfare and policy perspective, we argue that it is important to keep monitoring the sectoral output dynamics. Many countries have experienced so called boom-bust-cycle episodes in the aftermath of financial liberaliation. During the boom-periods, non-traded sectors grew very strongly, but the aftermath of a deprecation, or a fincial crisis, they also fell into a more severe and more sustained recesssion than the traded sector. As indicated above, non-traded sectors are responsible for the largest share of employment and thus are of particlar relevance when pursuing broader goals, such as poverty aliviation and long run balanced growth.

While providing some first results on this topic, the paper is clearly just a first step into a broader research agenda and several directions of further research remain of interest. For instance our paper relies on a historical annual data, while there also exist more recent quarterly data after 2000. In potential further research project would be to use these data and in particular take advantage of the data on the amount of rainfall as an instrument in the regressions to identify the effect domestic lending. Domestic credit and output growth are endogenous variables in most models. The provision of rainfall data in the monthly bulletins of the central bank of Sri Lanka could help to identify the direction of causality in a two-stage least squares regression.

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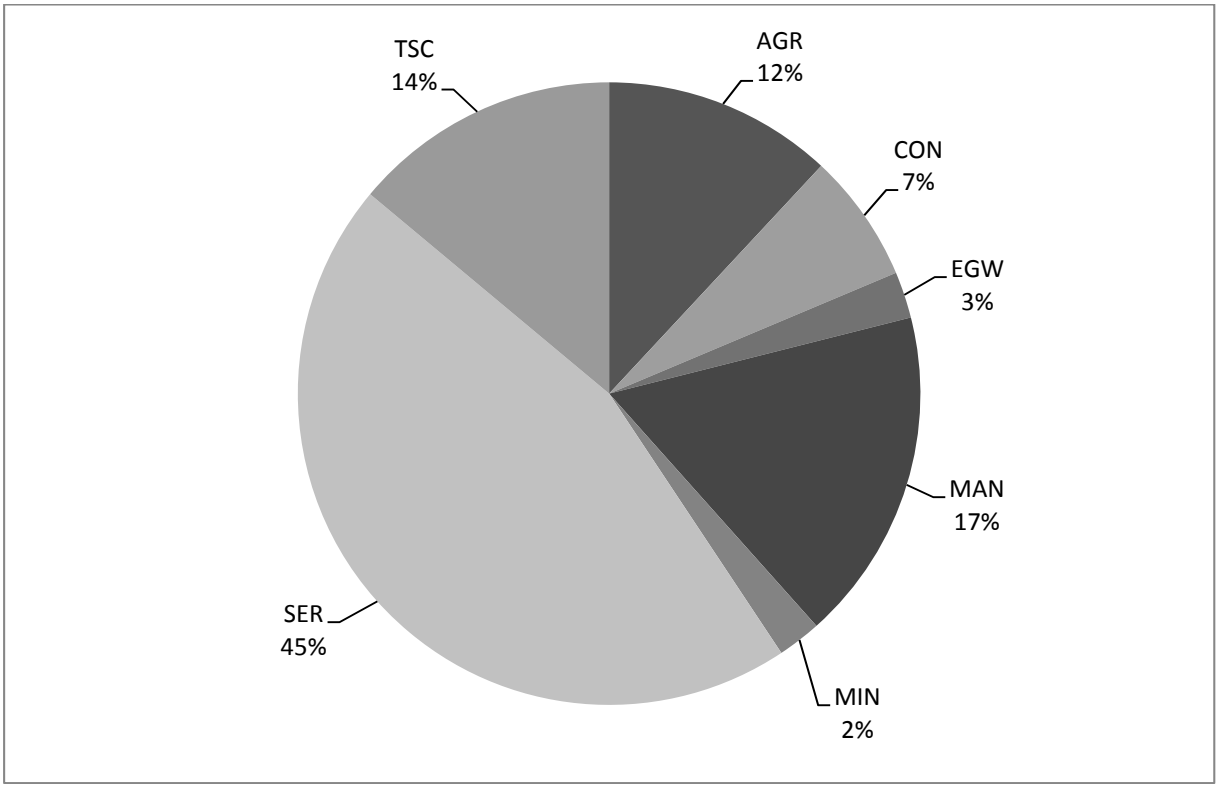
(To be completed with further reference)

Appendix

Figure A1: Share in total output



Appendix 1: Lending by sector	December 2010	December 2011
	Amount Rs. Mn.	Amount Rs. Mn.
1. Agriculture and Fishing	**216.786**	**264.268**
Tea	45.458	38.511
Rubber	14.35	16.96
Coconut	4.745	4.647
Paddy	13.847	11.554
Vegetable and Fruit Cultivation, and Minor Food Crops	6.863	8.927
Livestock and Dairy Farming	4.559	7.205
Fisheries	4.121	5.892
2. Industry	**547.276**	**687.652**
Construction	234.232	271.252
Personal Housing including Purchasing / Construction / Repairs	136.083	133.448
Staff Housing	24.754	25.586
Food and Beverages	31.429	42.248
Textiles and Apparel	85.342	98.678
Wood and Wood Products including Furniture	4.16	5.884
Paper and Paper Products	4.813	6.578
Chemical, Petroleum, Pharmaceutical and Healthcare and Rubber and Plastic Products	29.47	34.987
Non-Metallic Mineral Products	3.85	5.913
Basic metal Products	6.555	9.893
Fabricated Metal Products, Machinery and Transport Equipment	41.755	62.631
Manufactured Products not specified elsewhere	4.345	4.981
3. Services	**317.6**	**468.015**
Wholesale and Retail Trade	108.38	160.175
Tourism	32.396	46.641
Financial and Business Services	65.799	117.179
Transport	7.934	12.524
Communication and Information Technology	13.22	19.665
Printing and Publishing	5.825	8.419
Education	2.573	3.492
Health	8.139	8.966
Shipping, Aviation and Supply, and Freight Forwarding	8.872	11.391
4. Personal Loans and Advances (f)	**404.565**	**576.581**
Consumer Durables	35.2	67.414
Pawning	166.315	281.909
Credit Cards	30.535	36.067
Personal Education	135	574
Personal Healthcare	195	258
5. Safety Net Scheme Related (e.g.: Samurdhi)	**23.425**	**33.835**
6. Total	**1509.652**	**2030.351**