

Responding to Recession: Evidence from Thailand

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February 23, 2013

Acknowledgements. The authors would like to thank Shahidur Khandker of the World Bank for his essential role in leading the research project of which this is a component, and for his constant encouragement. We are also grateful to Lassana Cissokho of Université Cheikh Anta Diop for his valuable help in constructing the social accounting matrix for Thailand.

1. Introduction

World GDP fell by 0.6% in 2009. Buffeted by the shocks created by the great recession, the Thai economy contracted by 2.3% in that year. In this paper we ask how large the shocks to the Thai economy in 2008-09 were, how Thai households were affected by the shocks, and the extent to which the government's response cushioned those effects for different groups of households.

Following the three-layer approach recommended by Bourguignon and Pereira da Silva (2003), we first quantify the magnitude of the reductions in exports (broken down by group) and tourism, by comparing the actual values with a plausible counterfactual. We estimate that from October 2008 through September 2009, tourist arrivals were 12% below trend, and the dollar value of exports fell by 16%.

In the second layer we use a SAM multiplier analysis (following Round 2003) to measure the direct, indirect, and induced effects of the exogenous shocks to tourism and exports, using an updated 81-sector Social Accounting Matrix that has 61 "industrial" sectors. This allows us to simulate the effects of the shocks on the income in each sector.

For the third layer we map the sectoral changes in incomes to household incomes, using data from the Socio-Economic Surveys, which sample about 3,500 households every month. This allows us to measure the effects of the shocks on the distribution of income, as well as along other dimensions, including region and gender.

The government of Thailand reacted rapidly to the external shocks by, among other things, increasing pensions, extending unemployment benefits, and increasing subsidies to health and education. We superimpose these policy changes, most of which affected households directly, to obtain a simulated net effect. From this we are able to gauge the extent to which the government measures were able to cushion the estimated effects of the great recession. The high quality of the monthly trade and household survey data make it possible to trace the effects relatively precisely.

In section 2 we set up the problem by documenting the nature and size of the shocks to the Thai economy in 2008-09. We then set out the method used to trace the effects of those shocks on households (section 3). Our approach starts by quantifying the external shocks relative to a counterfactual (section 4), estimating the indirect and induced effects using a SAM-multiplier analysis (section 5), and tracing these sectoral effects through to households (section 6).

The government responded vigorously to the crisis, and we summarize the components of the relevant Stimulus Package 1 measures in section 7, before quantifying the net effects of the shocks and stimulus in section 7. Although our study focuses on just one country, the broad issue we are addressing – household responses to shocks, and the role that policy might play in softening the effects of these shocks – is of universal importance. We return to these issues in the concluding comments in section 8.

2. The Thai Recession of 2008-09

After almost a decade of solid economic growth, the Thai economy slipped into recession in the fourth quarter of 2008, and did not begin to grow again until the fourth quarter of 2009, as Figure 1 makes clear. The recession was shorter and shallower than the one that followed the Asian financial crisis of 1997, but the Thai economy still contracted by 2.3% in 2009, or by substantially more than the world economy, which shrank by 0.6% in that year (Figure 2).

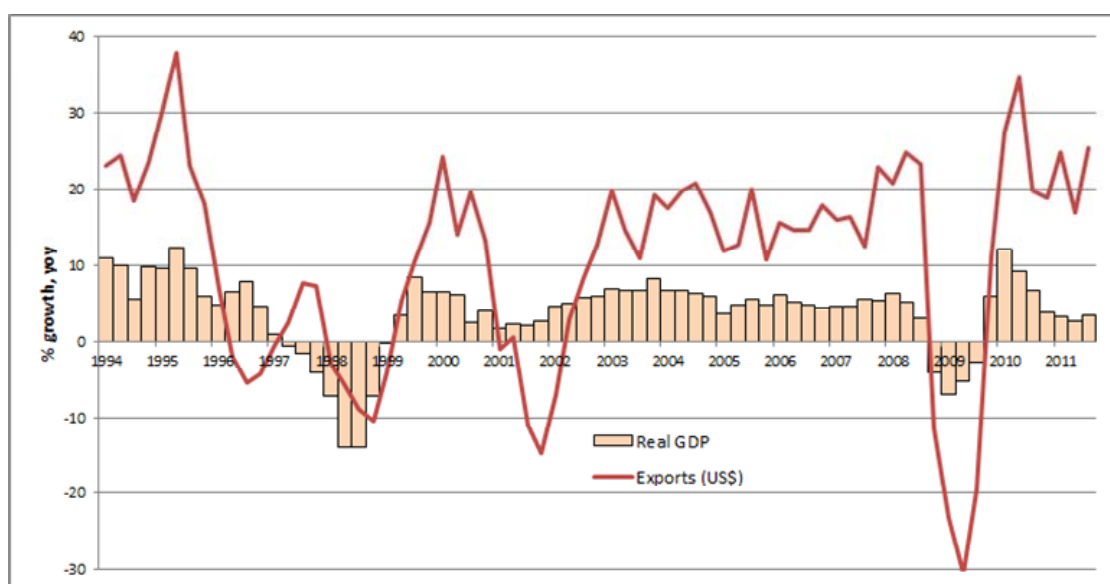


Figure 1. GDP and Export growth rates for Thailand, 1994:Q1 – 2011:Q3.

Source: Reported by Bank of Thailand

Not surprisingly, the unemployment rate rose sharply in early 2009 (Figure 3), although even then it remained relatively low by historical standards, at about 2%. Young workers were particularly hard hit, with unemployment for those aged 20-29 rising from 2.9% to 5.3% over the same period (Chandoewvit 2010). The labor market was impacted in other ways too: In the first quarter of 2009, 6% of employees reported that they were working for fewer hours than previously, and 11% said they were earning lower wages. Jitsuchon and Patanarangsun (2009) provide further sectoral details.

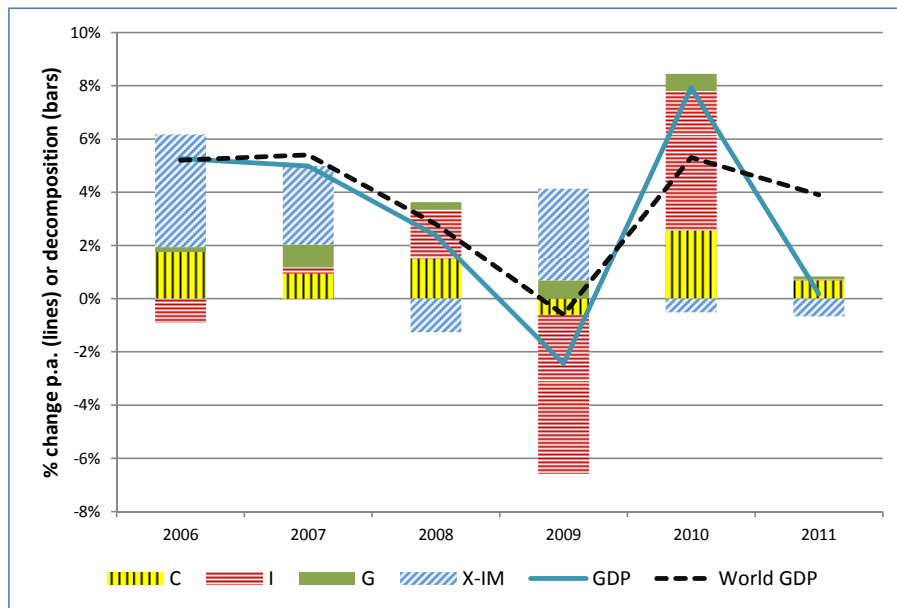


Figure 2. Decomposition of GDP growth into its macroeconomic components

Source: Data reported by Bank of Thailand; IMF (2012). Note: C = consumer spending; I = investment spending; G = government spending on goods and services; X-IM = net exports.

The most plausible explanation for the Thai recession is that it was transmitted to the country from the rest of the world via a massive fall in exports (see Figure 1), and a significant reduction in international tourist arrivals, which dropped from 14.6 million in 2008 to 14.1 million in 2009. We document these effects more fully in the next section.

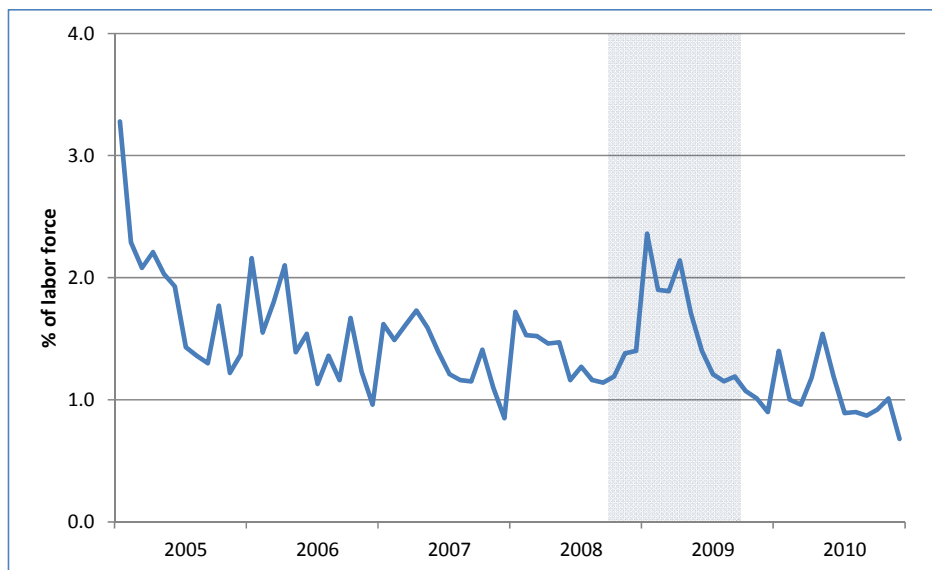


Figure 3. Unemployment Rate, Thailand, January 2005 – December 2010

Source: Reported by Bank of Thailand

Domestic political uncertainty played a role too, including an opposition blockade of the two main international airports, and a subsequent change in government, in late 2008. The combination of external shocks and domestic unrest had an enormous effect on investment spending, which fell by the equivalent of 6% of GDP in 2009 (Figure 2) before rebounding in 2010.

The recession reduced government revenue, but there was no associated drop in public spending, leading to substantial budget deficits in 2009 and 2010, as Figure 4 shows. This raised the level of public debt from 32% at the end of 2008 to 38% by the end of 2009 (Figure 5); essentially all of the incremental government borrowing was done domestically.

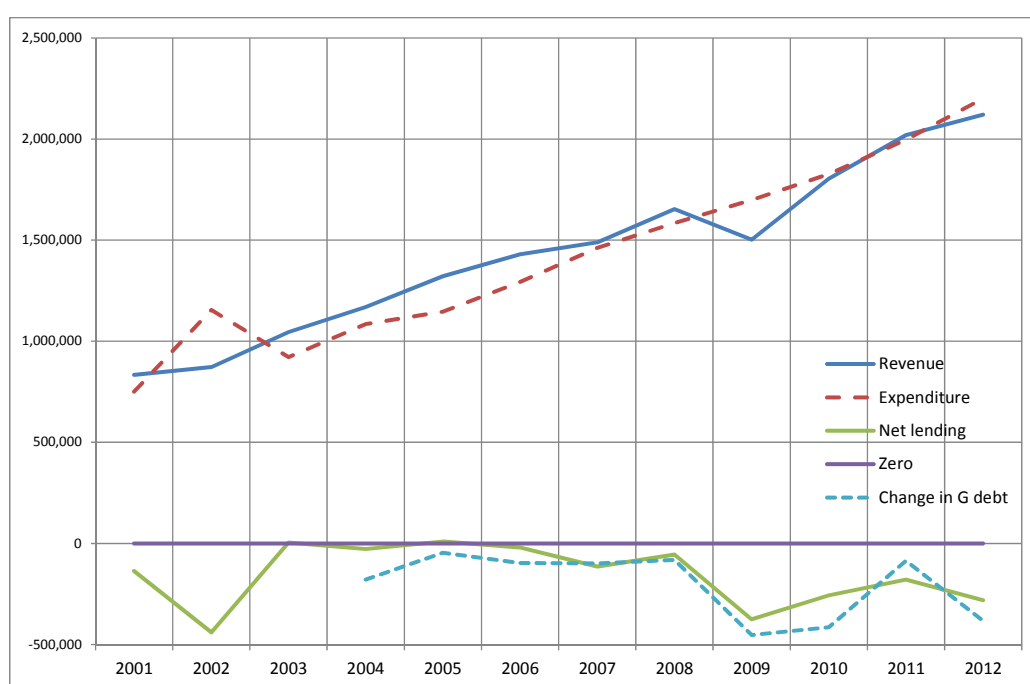


Figure 4. Thailand, Budget Operations, m baht

Source: http://dwfoc.mof.go.th/foc_eng/menu2.htm

3. Analytical Approach

In this section we set out the approach that we use to address our central questions. In order to link macroeconomic policies with measures of poverty and income distribution, Bourguignon and Pereira da Silva (2003) recommend that researchers think in terms of three layers. At the top (Layer 1) the idea is to identify the main macroeconomic aggregates and key prices, and create a counterfactual that allows one to estimate the effect of a shock or a policy (Bourguignon 2009).

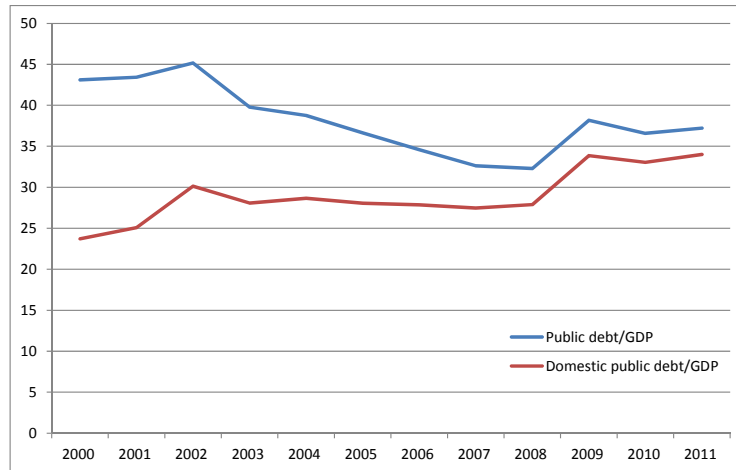


Figure 3. Public debt as a percentage of GDP, 2000-2011.

Source: Reported by Bank of Thailand

For instance, in the Thai context, tourist arrivals fell from 1.5 million in February 2008 to 1.1 million in February 2009; in the absence of any crisis, one would have expected tourist arrivals to rise – by an amount that one could estimate either by extrapolating past trends, or by referring to earlier forecasts. We develop a macroeconomic counterfactual in the same way, focusing on the two main external shocks: the fall in exports, and in tourist arrivals, from late 2008 onwards.

Having identified the shocks in Layer 1, the next step is to create a bridge between the macroeconomic magnitudes and the microeconomic effects. This is done in Layer 2. At this point, some researchers have used computable general equilibrium models (e.g. Bourguignon, Robilliard, and Robinson 2003; Devarajan and Go 2003; Chen and Ravallion 2003), but this approach is most appropriate when a single well-defined policy change or shock is under consideration – for instance, joining the WTO, or changing the price of copper – and when endogenous price changes are likely to be particularly important. We propose to use a more robust SAM-based multiplier model (Round 2003), where

$$y = Ay + x = M_A x.$$

Here y is a vector of account totals in the social accounting matrix (SAM), x is a vector of exogenous transactions – here we include government spending, the capital account, and the rest-of-the-world account – and A is the normalized SAM. This model measures the direct, indirect, and induced effects of exogenous shocks, and assumes that the shocks create spare capacity in the economy, which is a reasonable enough assumption in a period of recession. We propose to use an updated version of the 1998 Thai social accounting matrix (Li 2002), which has 81 sectors, including 61 “industrial” sectors, three categories of factor income, three groups of households, 12 sectors for government and taxes, and two other sectors (one for changes in stocks, the other for the “rest of the world”).

Consider, for example, the effect of the reduction in tourism in early 2009. By comparing actual with predicted tourist arrivals, we can measure the reduction in tourist numbers; drawing on information on the spending patterns of tourists, we can estimate the reduction in spending on hotels, restaurants, apparel, and perhaps other sectors that appear in the SAM. This measures the direct impact, but the indirect effects are likely to be important too; the indirect effect works through the input-output part of the SAM, as lower tourist spending on hotels and restaurants reduces the demand for foodstuffs, electricity, taxi services, energy, and so on; and the induced effect operates via the effect on factor incomes, so that as the wages and profits of those working in the hotel and restaurant sectors decline, so does their spending, and hence their demand for housing, for financial services, for entertainment, and the like.

The output of this exercise is a vector of changes in earnings (e) by sector, both actual and counterfactual. Using a simplified version of the household income simulation (HIMS) model that constitutes Level 3 of the analysis (see Bourguignon and Pereira da Silva, 2003; and Bourguignon, Robilliard, and Robinson, 2003), we assume that for the i^{th} member of household m with wages w in industry $g(mi)$, we have

$$d \ln(w_{mi}) = d \ln(e_{g(mi)}),$$

and for profits from a household enterprise we have

$$d \ln(\pi_{mi}) = d \ln(e_{g(mi)}).$$

This is equivalent to assuming that earnings in a given sector change across the board, whether via changes in pay rates or hours of work. Summing across household members, and allowing for government direct subsidies and transfers (T_m), we have

$$Y_{m,new} = Y_{m,old} + dY_m = Y_{m,old} + \sum_{i=1}^k d \ln(w_{mi}) \cdot w_{mi} + \sum_{i=1}^k d \ln(\pi_{mi}) \cdot \pi_{mi} + dT_m$$

As a first approximation, we ignore changes in relative prices, although in principle it would be possible to construct a price deflator that would reflect any shock-induced price changes. When this exercise is complete, it allows us to measure incomes, and income-related poverty and distribution, and to attribute changes in these measures to the recession (or to changes in government spending or other measures).

Once the model has been established, it is relatively straightforward to simulate the effects of alternative policy interventions on poverty and inequality, and to assess their ability to cushion the effects of recession. We now turn to the practical estimation of the effects of the external shocks from tourism and exports, one layer at a time.

4. Layer 1: Quantifying the External Shocks

Following the three-layer approach recommended by Bourguignon and Pereira da Silva (2003), we first quantify the magnitude of the reductions in tourism and exports (broken down by group), by comparing the actual values with a plausible counterfactual. We estimate that from October 2008 through September 2009, tourist arrivals were 12% below trend, and the dollar value of exports fell by 16%.

Tourism

One of the more important shocks to the Thai economy in 2008-09 was a reduction in the number of foreign visitors, from 14.6 million in 2008 to 14.1 million in 2009, although this was followed by a swift rebound to 15.9 million in 2010 and 19.1 million in 2011 (Bank of Thailand 2012).

To measure the economic shock due to reduced tourist numbers, we first create a counterfactual that plausibly estimates the number of tourists who would have visited Thailand in the absence of a world economic crisis, compute the difference between this number and actual arrivals (the shortfall), and estimate the effect of the shortfall on the major categories of spending.

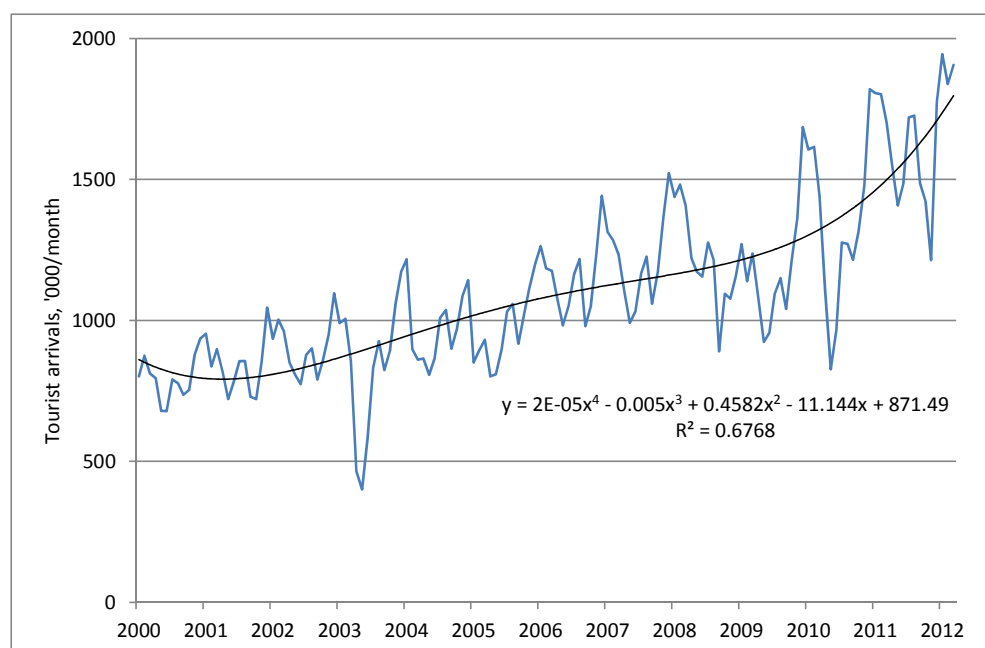


Figure 6. Actual and Trend International Tourist Arrivals, Thailand, January 2000 – March 2012

Source: Reported by Bank of Thailand

The story can best be told with the help of Figure 6, where the jagged line shows actual tourist arrivals, and the smoothed line is a fitted fourth-degree polynomial. Arrivals were below the trend for most of 2009; dropped dramatically, if briefly, in mid-2010 when there was a political crisis, and fell again very sharply at the end of 2011 due to the effects of the massive flooding in central Thailand.

The smoothed trend line in Figure 6 does not adequately account for seasonal variations in tourism; when we included dummy variables for months, we obtained the estimates shown in Table 1, which are based on monthly data from January 2000 through March 2012; the curve fits relatively well, with an adjusted R² of 0.87. The fitted values from this equation are shown by the dotted line in Figure 7.

Table 1. Fitted curve for international tourist arrivals

	Coefficient	p-value
Constant	212607	0.110
Date	-1674.467	0.096
Date ²	4.929	0.083
Date ³	-0.00614	0.071
Date ⁴	0.00000312	0.060
Dummy variables for months	Included	
Adjusted R ²	0.87	
Number of observations	183	

Source: Based on monthly data for January 2000 through March 2012, as reported by Bank of Thailand. “Date” assigns an integer to each month, starting with 1 in January 1960.

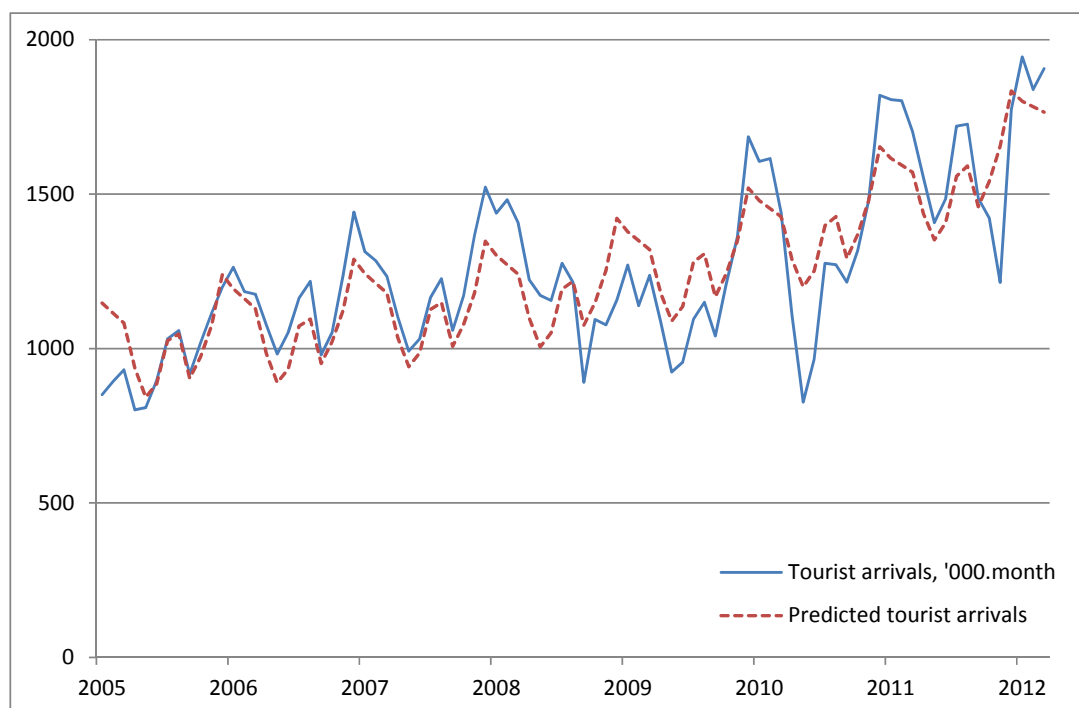


Figure 7. Actual and Fitted International Tourist Arrivals, Thailand, January 2000 – March 2012

Source: Reported by Bank of Thailand. Predicted values are based on the estimates reported in Table 1.

The shortfall in tourist arrivals is measured as the difference between the actual arrivals (solid line in Figure 7) and predicted arrivals (dotted line). From September 2008 through September 2009, arrivals were 12% lower than one would have expected, representing 153,000 fewer foreign tourists per month.

In 2008, the average tourist spent 39,393 baht per visit (Department of Tourism 2012); based on the pattern of spending observed in 2007 (the most recent year for which these data could be found; see Department of Tourism 2012: <http://www.tourism.go.th/>), a quarter of the spending went to shopping, another quarter to pay for accommodation, and smaller amounts for food and beverages (18%), and entertainment (12%). Based on these computations, we estimate the shortfall in tourist spending, per quarter, to be as shown in Table 2: for instance, the total shortfall was close to 20 trillion baht in the last quarter of 2008, of which about 5 trillion less was spent on accommodation than would have been the case in the absence of the worldwide recession (and closure of the airports in Bangkok in late November/early December 2008).

Table 2. Estimated loss of spending by international tourists, by quarter, 2008.Q4-2009.Q3, in billions of baht

	Total	<i>of which:</i>						
		Shopping	Entertain- ment	Sight- seeing	Accom- modation	Food & beverages	Local transport	Miscellaneous
2008.Q4	(19.47)	(5.19)	(2.27)	(0.85)	(5.30)	(3.45)	(1.86)	(0.55)
2009.Q1	(14.47)	(3.86)	(1.69)	(0.64)	(3.94)	(2.57)	(1.38)	(0.41)
2009.Q2	(15.83)	(4.22)	(1.85)	(0.70)	(4.31)	(2.81)	(1.51)	(0.44)
2009.Q3	(16.94)	(4.52)	(1.98)	(0.74)	(4.61)	(3.00)	(1.62)	(0.47)

Source: See text for explanation of computations.

Exports

One of the most striking features of the shock that hit Thailand in 2008-09 was the enormous drop in exports, from US\$17.4 billion in July 2008 to US\$10.5 billion in January 2009. Exports remained low for about six months, after which they rebounded rapidly, reaching the pre-recession peak by mid-2010. The pattern of exports shows clearly in Figure 8, where the smooth line is the fitted third-degree polynomial.

As we did in the case of tourism, we estimated the shortfall in exports by the distance between a fitted equation that includes dummy variables for months, using data from January 2000 through March 2012. The estimated equation for exports overall is shown in Table 3, and in Figure 9, the fitted values from this equation (dotted line) are shown along with the actual values (continuous line), and the shortfall in exports is given by the difference between the fitted and actual values of exports.

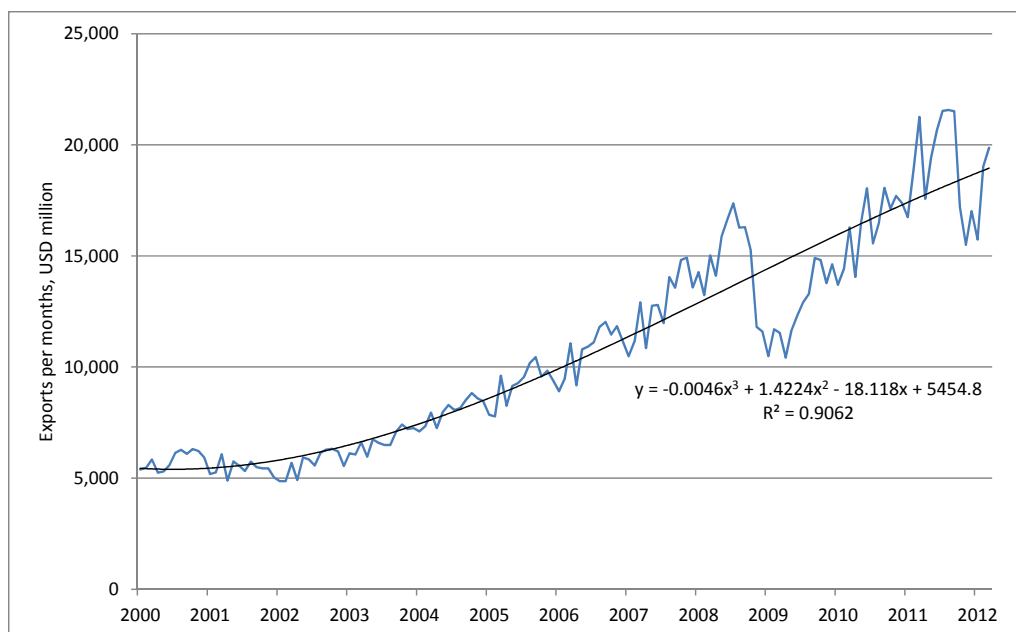


Figure 8. Actual and Trend Exports, Thailand, January 2000 – March 2012, USD million

Source: Reported by Bank of Thailand

Table 3. Fitted curve for international tourist arrivals

	Coefficient	p-value
Constant	392172	0.001
Date	-2088.8	0.002
Date ²	3.605	0.005
Date ³	-0.00195	0.014
Dummy variables for months	Included	
Adjusted R ²	0.93	
Number of observations	183	

Source: Based on monthly data for January 2000 through March 2012, as reported by Bank of Thailand. “Date” assigns an integer to each month, starting with 1 in January 1960.

For the SAM multiplier analysis, it is helpful to disaggregate the shortfall of exports by sector. For every category for which the value of exports exceeded about US\$5 billion in 2011, we conducted a separate analysis similar to the one undertaken for total exports: we fitted a trend line (cubic in time, with monthly dummies), and measured the shock as the difference between the fitted and actual values. The findings are summarized in Table 4.

By our measure, there was a shock to exports that reduced their dollar value by 16% relative to trend. The observed drop in exports during the year of recession (October 2008 – September 2009), relative to the period just prior to the recession, was somewhat larger than this, at 19%, but the earlier period was one of exceptionally high export levels and growth, which may not have been sustainable.

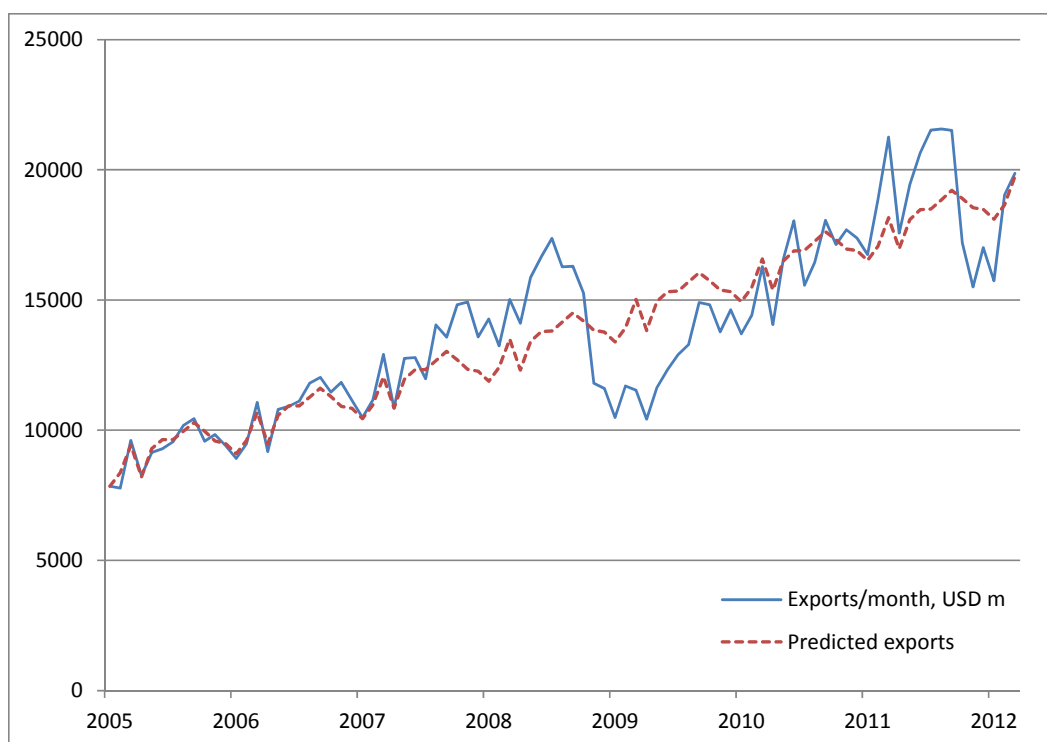


Figure 9. Actual and Fitted Exports, Thailand, January 2000 – March 2012, USD million

Source: Reported by Bank of Thailand

Table 4. Estimated size of shocks to Thai exports, by quarter, 2008.Q4-2009.Q3, in billions of baht

Export category	2008.Q4	2009.Q1	2009.Q2	2009.Q3	Totals	Exports	% shock
Rice	-7	0	1	0	-7	165	-4
Rubber	-13	-30	-33	-32	-109	139	-44
Food	7	-12	-10	-7	-23	378	-6
Rub prods	-4	-8	-6	-5	-22	81	-22
Apparel	-5	-9	-9	-10	-33	225	-13
Electronics	-39	-82	-46	-21	-187	916	-17
Appliances	-13	-28	-22	-11	-75	267	-22
Metal	4	-11	-12	-7	-27	264	-9
Auto	-3	-46	-55	-38	-143	497	-22
Mach & Equipt	-2	-25	-25	-21	-73	358	-17
Jewelry	-2	-6	-10	-5	-23	137	-14
Chemicals	-9	-11	-7	-5	-32	140	-19
Petrochemicals	-14	-23	-18	-14	-70	220	-24
Other mfg	0	-6	-12	-9	-27	245	-10
Other exports	-3	21	-57	-7	-47	876	-5
All exports	-109	-304	-336	-203	-950	5127	-16

Source: See text for explanation of computations. Exchange rate from Bank of Thailand; monthly export data in US\$ from Customs Department, as compiled by the Bank of Thailand.

5. Layer 2: The Indirect and Induced Effects of the Shocks

In the second layer we use an input-output, and SAM multiplier, analysis (following Round 2003) to measure the indirect, and induced, effects of the exogenous shocks to tourism and exports. This allows us to simulate the effects of the shocks on the income in each sector.

To construct a social accounting matrix for 2009, we began with an existing 2005 SAM, which we updated to 2009 by incorporating government accounts for 2009. The SAM has 72 sectors, of which 58 are “industrial sectors” – these are listed in Table 5 – and the remaining sectors include two factors (labor and capital), three groups (households, enterprises, and government), four taxes, transportation costs, savings, changes in inventories, and a rest-of-the-world category.

Formally, let X be an $n \times 1$ vector of final output, which may be used to satisfy final demand (F), where final demand includes such categories of spending as consumption, and exports. Output may also be used to provide intermediate inputs. We thus have

$$X = AX + F$$

where A is the $n \times n$ matrix of SAM coefficients. Some manipulation gives

$$X = (I - A)^{-1} F.$$

In analysing the effects of shocks to final demand (ΔF), we have

$$\Delta X = (I - A)^{-1} \Delta F. \quad (1)$$

If we assume that income in sector i is proportional to spending in that sector, then we have a vector of sector-specific changes in income given by

$$d \ln(I) = d \ln(\Delta X).$$

When we use the full SAM, the changes in X (and I) that result from a direct change in F include both the indirect effects (where more demand for sector I leads to greater demand for inputs from sector j , and so on) as well as the induced effects (where more demand for sector I raises incomes and so increases demand for the final output of sector j). If one uses only the input-output table, equation (1) gives just the direct and indirect, but not the induced, effects of the change in final demand.

Table 5 shows the results of simulating the effects of the external shocks that were measured in section 4, for all of the SAM industrial sectors. The first three columns of number show, for tourism, the direct effect on output, the direct and indirect effects using the input-output tables, and direct, indirect, and induced effects from the SAM multiplier analysis. Although the direct effect represented a 67 billion baht annual shock, when one adds indirect effects this doubles to 134 billion baht, and to 203 billion baht when the induced effects are included.

Table 5. Direct, indirect, and induced changes in output and labor, by SAM category

	Tourism			Exports			Tourism			Exports		
	Direct	+indirect	+induced	Direct	+indirect	+induced	Direct	+indirect	+induced	Direct	+indirect	+induced
	bn baht			bn baht			% change in labor bill			% change in labor bill		
Paddy (001)	0.0	-0.6	-1.4	0.0	-5.2	-12.4	0.0	-0.3	-0.7	0.0	-2.8	-6.7
Maize (002)	0.0	-0.1	-0.2	0.0	-0.5	-1.4	0.0	-0.7	-1.1	-0.1	-2.3	-6.7
Cassava (004)	0.0	-0.1	-0.2	0.0	-0.6	-1.6	0.0	-0.4	-0.8	0.0	-2.6	-6.5
Beans and Nuts (006)	0.0	-0.3	-0.4	0.0	-0.8	-1.8	0.0	-0.9	-1.3	-0.1	-2.8	-6.2
Vegetables and Fruits (007-008)	0.0	-2.0	-5.3	-0.2	-2.5	-34.1	0.0	-0.4	-1.0	0.0	-0.5	-6.7
Sugarcane (009)	0.0	-0.1	-0.2	0.0	-0.9	-1.8	0.0	-0.5	-0.8	0.0	-3.5	-6.6
Rubber (Latex) (016)	0.0	-0.1	-0.2	-25.3	-62.4	-63.4	0.0	-0.1	-0.1	-14.0	-34.6	-35.2
Other Crops (003, 005, 010-015,017, 024)	0.0	-0.7	-1.3	-0.1	-4.2	-9.8	0.0	-0.5	-0.9	-0.1	-3.0	-7.0
Livestock (018-023)	0.0	-1.4	-2.7	0.0	-1.6	-13.3	0.0	-0.7	-1.3	0.0	-0.8	-6.4
Forestry (025-027)	0.0	-0.3	-0.4	0.0	-0.7	-1.8	0.0	-0.8	-1.1	-0.1	-1.8	-4.7
Fishery (028-029)	0.0	-1.4	-2.5	0.0	-3.2	-13.6	0.0	-0.7	-1.2	0.0	-1.6	-6.7
Crude Oil and Coal (030-031)	0.0	-3.8	-6.5	-0.6	-57.8	-83.8	0.0	-0.3	-0.6	-0.1	-5.2	-7.6
Metal Ore (032-035)	0.0	-0.2	-0.2	0.0	-2.0	-2.3	0.0	-1.2	-1.4	0.0	-13.8	-15.8
Non-Metal Ore (036-041)	0.0	-0.3	-0.4	0.0	-1.9	-2.7	0.0	-0.3	-0.4	-0.1	-2.3	-3.3
Slaughtering (042)	0.0	-1.7	-2.8	0.0	-1.5	-12.0	0.0	-1.0	-1.6	0.0	-0.9	-6.7
Processing and Preserving of Foods (043-048)	-3.0	-4.5	-6.3	-19.7	-23.8	-40.6	-0.5	-0.7	-1.0	-3.2	-3.9	-6.6
Rice and Other Grain Milling (049-052)	0.0	-1.0	-2.3	-7.7	-9.0	-21.2	0.0	-0.3	-0.7	-2.3	-2.7	-6.4
Sugar Refineries (055)	0.0	-0.4	-0.7	-2.2	-3.0	-5.6	0.0	-0.5	-0.8	-2.6	-3.5	-6.6
Other Foods (053-054, 056-060)	-3.0	-4.3	-5.3	-3.6	-5.0	-14.6	-1.4	-2.0	-2.5	-1.7	-2.3	-6.9
Animal Food (061)	0.0	-0.6	-1.0	-1.3	-2.2	-6.6	0.0	-0.7	-1.2	-1.6	-2.6	-7.9
Beverages (062-064)	-3.0	-4.7	-7.2	-0.1	-0.7	-24.5	-0.6	-1.0	-1.5	0.0	-0.1	-5.0
Tobacco Processing and Products (065-066)	0.0	-0.1	-0.6	0.0	-0.1	-4.9	0.0	-0.1	-0.6	0.0	-0.1	-4.6
Spinning, Weaving and Bleaching (067-069)	0.0	-2.3	-3.7	-1.0	-23.4	-37.1	0.0	-0.6	-0.9	-0.2	-5.8	-9.2
Textile Products (070-074)	-4.0	-4.6	-7.4	-35.6	-39.6	-66.9	-0.6	-0.7	-1.1	-5.3	-5.9	-10.0
Paper and Paper Products (081-082)	0.0	-0.7	-1.3	-0.4	-5.8	-11.0	0.0	-0.3	-0.5	-0.2	-2.4	-4.6
Printing and Publishing (083)	0.0	-0.5	-0.9	-0.2	-2.0	-6.1	0.0	-0.4	-0.8	-0.1	-1.8	-5.5
Basic Chemical Products (084,086)	0.0	-1.7	-2.9	-28.1	-67.7	-79.2	0.0	-0.2	-0.4	-3.6	-8.7	-10.1
Fertilizer and Pesticides (085)	0.0	-0.4	-0.9	0.0	-6.8	-11.3	0.0	-0.4	-0.8	0.0	-6.5	-11.0
Other Chemical Products (087-092)	0.0	-1.4	-4.3	-7.3	-18.4	-46.2	0.0	-0.2	-0.6	-1.1	-2.8	-6.9
Petroleum Refineries (093-094)	0.0	-5.2	-8.9	-71.6	-94.8	-130.5	0.0	-0.4	-0.7	-5.7	-7.5	-10.3
Rubber Products (095-097)	0.0	-0.4	-0.7	-108.3	-123.5	-127.0	0.0	-0.1	-0.2	-32.5	-37.0	-38.1
Plastic Wares (098)	0.0	-0.8	-1.4	-0.8	-12.5	-18.8	0.0	-0.3	-0.5	-0.3	-4.5	-6.7
Cement and Concrete Products (102-103)	0.0	-0.1	-0.2	-0.2	-0.6	-1.0	0.0	-0.1	-0.1	-0.1	-0.3	-0.5
Other Non-metallic Products (099-101, 104)	-2.0	-2.3	-2.6	-0.5	-5.1	-8.2	-0.9	-1.1	-1.2	-0.2	-2.4	-3.8
Iron and Steel (105-106)	0.0	-0.7	-1.4	-16.6	-85.3	-91.7	0.0	-0.1	-0.2	-2.3	-11.6	-12.5
Non-ferrous Metal (107)	-2.0	-2.9	-3.3	-11.7	-33.8	-37.6	-0.7	-1.0	-1.1	-4.0	-11.6	-12.9
Fabricated Metal Products (108-111)	0.0	-0.9	-1.6	-75.6	-89.4	-96.3	0.0	-0.2	-0.4	-17.0	-20.1	-21.7
Industrial Machinery (112-115)	0.0	-0.6	-1.1	-53.8	-81.9	-86.3	0.0	-0.1	-0.1	-6.6	-10.0	-10.5
Electrical Machinery and Apparatus (116-122)	-2.0	-4.8	-7.4	-202.6	-318.2	-343.8	-0.1	-0.1	-0.2	-6.0	-9.4	-10.2
Motor Vehicles and Repairing (125-127)	0.0	-1.4	-3.9	-146.0	-188.1	-212.3	0.0	-0.1	-0.3	-10.6	-13.7	-15.4
Other Transportation Equipment (123-124, 128)	0.0	-0.2	-0.3	-20.9	-23.6	-24.2	0.0	-0.1	-0.1	-10.5	-11.9	-12.2
Leather Products (075-077)	-2.0	-2.3	-3.4	-0.8	-2.0	-12.3	-0.8	-0.9	-1.3	-0.3	-0.8	-4.8
Saw Mills and Wood Products (078-080)	-2.0	-2.5	-3.0	-0.8	-3.0	-7.9	-0.7	-0.9	-1.0	-0.3	-1.0	-2.7
Other Manufacturing Products (129-134)	-4.0	-5.7	-8.0	-52.6	-68.2	-90.7	-0.4	-0.6	-0.9	-5.6	-7.3	-9.7
Electricity and Gas (135-136)	0.0	-3.7	-6.3	0.0	-26.6	-51.9	0.0	-0.5	-0.8	0.0	-3.5	-6.8
Water Works and Supply (137)	0.0	-0.1	-0.3	0.0	-0.7	-2.6	0.0	-0.3	-0.8	0.0	-1.7	-6.6
Building Construction (138-139)	0.0	-0.1	-0.1	0.0	-0.7	-1.1	0.0	0.0	0.0	0.0	-0.2	-0.3
Public Works and Other Construction (140-144)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trade (145-146)	0.0	-8.8	-15.3	0.0	-148.6	-211.6	0.0	-0.4	-0.7	0.0	-6.5	-9.2
Restaurants and Hotels (147-148)	-21.1	-21.6	-25.8	0.0	-5.1	-45.4	-2.6	-2.7	-3.2	0.0	-0.6	-5.7
Transportation (149-158)	-9.3	-10.9	-13.5	0.0	-7.4	-32.5	-0.9	-1.0	-1.3	0.0	-0.7	-3.1
Communication (159)	0.0	-1.4	-2.6	0.0	-7.2	-19.1	0.0	-0.4	-0.8	0.0	-2.2	-5.9
Banking and Insurance (160-162)	0.0	-2.0	-3.9	0.0	-19.8	-38.0	0.0	-0.4	-0.8	0.0	-3.9	-7.4
Real Estate (163)	0.0	-0.4	-2.1	0.0	-1.8	-18.3	0.0	-0.1	-0.7	0.0	-0.6	-5.9
Business Services (164)	-1.9	-3.0	-3.5	0.0	-7.6	-12.8	-0.9	-1.4	-1.6	0.0	-3.5	-5.9
Public Services (165-169)	0.0	-0.2	-1.2	0.0	-0.8	-10.8	0.0	0.0	-0.1	0.0	-0.1	-1.2
Other Services (170-178)	-7.8	-9.9	-11.2	0.0	-4.4	-16.9	-2.2	-2.9	-3.2	0.0	-1.3	-4.9
Unclassified (180)	0.0	-0.4	-0.9	0.0	-3.9	-9.0	0.0	-0.3	-0.7	0.0	-2.8	-6.5
Total / % change in labor bill	-66.7	-133.6	-203.1	-896.2	-1717.6	-2390.2	-0.2	-0.5	-0.7	-1.5	-4.2	-6.7

The effect of the fall in exports was an order of magnitude larger than the drop in tourism, with combined effects of 2.4 trillion baht. The sectors that were most heavily hit include electrical machinery, motor vehicles, trade, petroleum, and rubber. When the indirect and induced effects are included, even some sectors that were not hit by the drop in exports were significantly affected, including agriculture, beverages, metals, restaurants, and utilities.

The right hand side of Table 5 shows the percentage change in earnings, by sector. In the absence of any other effects, the shock to tourism reduced earnings nationally by anywhere between 0.2% (direct effect along) and 0.7% (direct, indirect, and induced effects); for the export shock, the reduction in incomes, *ceteris paribus*, was at least 1.5%, and perhaps as much as 6.7%.

Sectors are not people, and in the next step we map the sectoral reductions in incomes into household-level changes in income.

6. Layer 3: The Impact of Shocks on Households

For the third layer we map the sectoral changes in incomes to household incomes, using data from the 2009 Socio-Economic Survey, which sampled about 3,500 households every month. This allows us to measure the effects of the shocks on the distribution of income, as well as along other dimensions, including region and gender.

The process works as follows. Based on the SAM multiplier analysis, we have an estimate of the change in earnings – direct, indirect, and induced – for each of 58 sectors. The 2009 Socio-economic Survey asks households for information on the sector in which each member works; the mapping is not perfect, but we were able to associate jobs, including self-employment, with one of the SAM sectors for 90% of households in the survey. On the assumption that an $x\%$ reduction in income in sector I applies equally to all those working in that sector, we are able to estimate the reduction in income for each households – after taking into account the fact that some people work multiple jobs, and many households have more than one earner.

The essential results are shown in Table 2, which breaks down monthly household income per capita in 2009 by decile, region, area, and group. Subsequent columns show the effects on income of the direct effects, direct + indirect effects, and then the full set of direct, indirect, and induced effects.¹

The simulations show that if the full impacts had come to bear, income would have fallen by 7.5% (relative to trend), with the biggest relative reductions to income being among the better-off households. The North and Northeast regions were the least affected; the South was especially hard hit, due mainly to a dramatic reduction in the price of rubber.

¹ Strictly speaking, our baseline should not be the observed levels of income in 2009, but rather the counterfactual of what incomes would have been in the absence of shocks. However, such a baseline would not be robust, given the strong assumptions required to create the counterfactual. The percentage changes, on which we focus, would not change much if the baseline were defined differently in this way.

Table 6. Income per capita per month, 2009, with and without tourism and export shocks, baht

Effects:							
	Baseline	Direct	%	Direct + indirect	%	Direct + indirect + induced	%
Decile:							
1	1,025	1,018	-0.7	1,013	-1.2	1,004	-2.1
2	1,747	1,726	-1.2	1,700	-2.7	1,672	-4.3
3	2,242	2,213	-1.3	2,175	-3.0	2,136	-4.7
4	2,758	2,716	-1.5	2,663	-3.5	2,613	-5.3
5	3,356	3,290	-2.0	3,217	-4.1	3,152	-6.1
6	4,077	3,985	-2.3	3,886	-4.7	3,802	-6.8
7	5,081	4,961	-2.3	4,821	-5.1	4,714	-7.2
8	6,608	6,433	-2.7	6,242	-5.5	6,101	-7.7
9	9,199	8,954	-2.7	8,657	-5.9	8,463	-8.0
10	21,661	20,859	-3.7	20,181	-6.8	19,741	-8.9
Overall	5,775	5,615	-2.8	5,455	-5.5	5,339	-7.5
Region							
Bangkok	11,328	10,965	-3.2	10,713	-5.4	10,475	-7.5
Center	6,549	6,330	-3.3	6,168	-5.8	6,027	-8.0
North	4,977	4,915	-1.2	4,816	-3.2	4,708	-5.4
NE	4,204	4,117	-2.1	4,043	-3.8	3,966	-5.7
South	6,608	6,330	-4.2	5,918	-10.4	5,798	-12.3
Area							
Urban	8,777	8,537	-2.7	8,324	-5.2	8,147	-7.2
Rural	4,589	4,461	-2.8	4,322	-5.8	4,230	-7.8
Group							
Children	4,405	4,286	-2.7	4,161	-5.5	4,072	-7.6
Women	5,862	5,704	-2.7	5,546	-5.4	5,430	-7.4

Source: See text for explanation and sources.

Table 7 separates the effects of the tourism shocks from those attributable to exports. In most deciles, the effect of the export shock was almost six times as large as that of the tourism shock; the exception is the top decile, where the tourism shock hit relatively harder.

It must be emphasized here that the numbers in Tables 6 and 7 are based on simulations. One important missing piece is the effect of government interventions to cushion the effects of the recession, which we address in the next section.

7. The Government Response and its Effectiveness

The government of Thailand reacted rapidly to the external shocks by, among other things, increasing pensions, extending unemployment benefits, and increasing subsidies to health and education. We superimpose these policy changes, most of which affected households directly, to obtain a simulated net effect. From this we are able to gauge the extent to which the government measures were able to cushion the

Table 7. Effects of shocks to tourism, and to exports, on income, 2009

	Tourism			Exports			
	Baseline	Direct	Direct + indirect	Direct + indirect + induced	Direct	Direct + indirect	Direct + indirect + induced
<i>baht per capita per month</i>							
Decile:							
1	1,025	1,023	1,022	1,021	1,021	1,016	1,008
2	1,747	1,741	1,739	1,736	1,732	1,708	1,683
3	2,242	2,236	2,232	2,229	2,220	2,185	2,150
4	2,758	2,748	2,744	2,739	2,727	2,678	2,632
5	3,356	3,338	3,332	3,326	3,308	3,241	3,183
6	4,077	4,053	4,045	4,037	4,009	3,918	3,841
7	5,081	5,052	5,042	5,032	4,990	4,859	4,763
8	6,608	6,566	6,552	6,538	6,475	6,298	6,171
9	9,199	9,144	9,124	9,105	9,009	8,732	8,557
10	21,661	21,377	21,328	21,284	21,143	20,514	20,118
Overall	5,775	5,727	5,716	5,704	5,663	5,515	5,410
<i>% change relative to baseline</i>							
Decile:							
1		-0.2	-0.3	-0.4	-0.4	-0.9	-1.7
2		-0.3	-0.5	-0.6	-0.9	-2.2	-3.7
3		-0.3	-0.5	-0.6	-1.0	-2.6	-4.1
4		-0.4	-0.5	-0.7	-1.2	-2.9	-4.6
5		-0.5	-0.7	-0.9	-1.4	-3.4	-5.2
6		-0.6	-0.8	-1.0	-1.7	-3.9	-5.8
7		-0.6	-0.8	-1.0	-1.8	-4.4	-6.2
8		-0.6	-0.8	-1.1	-2.0	-4.7	-6.6
9		-0.6	-0.8	-1.0	-2.1	-5.1	-7.0
10		-1.3	-1.5	-1.7	-2.4	-5.3	-7.1
Overall		-0.8	-1.0	-1.2	-1.9	-4.5	-6.3

Source: See text for explanation and sources.

estimated effects of the great recession. The high quality of the monthly trade and household survey data make it possible to trace the effects relatively precisely.

As noted above, Thailand's economic crisis began in 2008, hit bottom in the first quarter of 2009, and showed signs of recovery by the middle of 2009. The crisis coincided with a period of political instability, although economic policy showed greater continuity, as most of the policies of the Thaksin-allied governments under Prime Ministers Samak Sundarej (January-September 2008) and Somchai Wongsawat (September-December 2008) were carried over into the subsequent government.

In early 2008, the cabinet reduced personal and corporate taxes for a total of 40 billion baht; a second set of interventions were designed to alleviate the hardships of low-income groups through micro-credit and facilitated credit by government banks. These included more funding for village-level initiatives, and easier credit for farmers, housing, and small businesses. The third set of policies, announced in June 2008 for a total of 50 billion baht consisted of six relief measures that were to last from July 2008 to January 2009 to mitigate

the impacts of the ensuing crisis on low-income groups, including (i) a reduction to almost zero of the excise tax on gasohol and diesel (ii) freezing of the price of LPG gas for cooking (iii) reducing utility water charges (iv) reducing electricity charges v) reducing the cost of bus travel and offering free travel on non-air-conditioned buses, and vi) providing free railway travel in third class.

This three-fold strategy was criticized by the opposition on the grounds that it copied previous policies, lacked clear targeting and monitoring systems, and put in place populist policies that were costly. However, when the opposition took power in December 2008 and Abhisit Vejjajiva became the Prime Minister, these same policies were sustained and expanded. One of the first actions of the new government was to extend the validity of the relief measures for another year, to keep the cost of living down. Only the fuel subsidy was cancelled, because of the sharp decline in oil prices. The free bus and train rides, and subsidies for water and electricity charges were retained with the understanding that more attention would be given to ensuring that they would indeed benefit low-income people. A 40 billion baht tax program was also launched that included measures to benefit small enterprises and aimed to preserve employment.

Then, in early 2009, in direct response to the economic crisis, the government approved a 116.7 billion Baht supplementary budget to fund a *first stimulus package* (SP1) that introduced new social protection measures including cash transfers, job training, subsidies for education, increased funding for community development projects, and housing support. The details are set out in Table 8, and included the following:

- The provision of one-time 2000-baht hand-outs (Saving the Nation checks) to workers who contributed to the Social Security Fund, state enterprise employees and civil servants (including tambon and village heads) who were earning less than 15,000 baht per month.
- The distribution of 500 baht monthly allowances for a period of six months, starting in April 2010, to senior citizens aged 60 or older who did *not* receive support from other government institutions.
- The extension of unemployment benefits from six to eight months for formal sector employees under the SSF scheme.
- The extension of free public education to 15 years in the 2009 school year, providing student uniforms, textbooks, and exercise books free-of-charge, as well as subsidizing other school costs.
- The allocation of an additional 10 billion baht for student loans through existing programs.
- The provision of free utilities for low-income households and individuals. This provision included free electricity and tap-water for poor households, and free third-class bus and train transportation.
- Several modest tax cuts, of which the most important were tax waivers and reduced fees in the real estate sector.

In the second half of 2009, the government unveiled a second stimulus package (SP2) of 1.43 trillion Baht

that was designed to fund public investment in various projects across the country until 2012. In total, 1.05 trillion baht of the second stimulus package were planned to be financed by external and internal loans, making this package the most expensive off-balance spending ever. The main social protection effect of the SP2 was seen as working through the generation of employment, as no additional welfare programs were created, and the focus was on economic recovery and long-term growth.

Table 8. Details of Stimulus Package 1

	Amount (m baht)	% disbursed, Mar-May 2009
Total mid-year supplementary budget	116,700	47
<i>of which:</i>		
1. Economic recovery and confidence restoration	37,464	
1.1 Stimulus Checks of 2,000 baht for low-income earners Living cost subsidy for income earners of < 15,000 baht: 8.1m persons with social security, 1.3m public sector officials, including pensioners	18,970	93
1.2 Household subsidies Extension of subsidies for utilities and transport for a further 6 months	11,409	74
1.3 Agricultural water resources development	2,000	10
1.4 Road construction in villages and rural areas (490 km)	1,500	0
1.5 Subsidies for consumer goods	1,000	4
1.6 Tourism promotion	1,000	45
1.7 Small water resource and water management	760	
1.8 Small and medium enterprise (SME) promotion	500	27
1.9 Economic confidence restoration and national image promotion	325	1
2. Revenue creation, Quality of life enhancements, and social Security	56,004	
2.1 Free education program for the first 15 years Education to be free for first 15 years; subsidies for uniforms, books. Benefits 10m students.	19,000	81
2.2 Sufficiency economy promotion of society development fund Increased funding for 78,358 villages	15,200	33
2.3 Monthly allowance for senior citizens 500 baht per months for 6 months, for those aged 60 or above not currently receiving government support; 5 million beneficiaries.	9,000	67
2.4 Unemployment reduction and labor potential promotion One-month training and 3 months of living cost allowances. 240,000 persons affected.	6,900	2
2.5 Health care promotion Subsidy of 600 baht per month to 830,000 persons.	3,000	60
2.6 Civil servant and police officers housing scheme	1,809	1
2.7 Clinic and health station development	1,096	<1
3. Budget management: contingency fund	4,090	0
4. Treasury cash repayment	19,139	0

Sources: Table 2 in Jitsuchon (2010); and World Bank and ASEAN Secretariat (2010), using data from Bank of Thailand.

According to a report of the ASEAN Secretariat (World Bank and ASEAN Secretariat 2010), as of May 2009, 55.8 billion Baht (47 percent) of the first stimulus package had been spent; the details are shown in Table 8. A report by the World Bank (2009) concluded that “the first stimulus package has been “modestly” pro poor”, but went on to observe that the package resulted in a bias against the poor in the informal sector

because of the particular mechanisms that were used to disburse funds rapidly (such as the social security system for the 2000-baht checks), and because there was insufficient targeting of vulnerable groups.

The Thailand Development Research Institute (TDRI) reported in its study, *Economic Shocks and the Vulnerable in Thailand*, in March 2009 that “the needs of the poorest were not sufficiently met by the first package and that interventions, now as in previous crises, were not well-targeted due to a lack of basic information that could accurately identify the vulnerable segments of the population” (Jitsuchon and Siamwalla, 2009).

Jitsuchon (2010) recently attempted to evaluate the effectiveness of the stimulus policies using criteria such as swiftness, targeting effectiveness, reaching out to the vulnerable, long-term considerations, and fiscal sustainability. his study finds positive overall effects for the stimulus packages, especially on swiftness, long-term consideration, and fiscal sustainability. However, the study finds some flaws in targeting. For example, the study finds that cash transfers and subsidies such as stimulus checks and utility subsidies did not reach the neediest. The free school program did not achieve its intended objectives, and the government spending and investment did not achieve government’s goal in terms of overall labor market outcomes.

In our study we are able to allocate the main SP1 spending – stimulus checks, school subsidies, and monthly allowances for senior citizens, which account for 71% of the spending in March-May 2009 – to households, on the basis of eligibility. The Socio-economic Survey did not gather information on who actually received these benefits, which is why we had to impute the effects.

The results of this exercise are shown in Table 9. On average, these measures raised annual incomes by 0.9%, but the effects varied substantially: poor households gained more than did affluent ones, mainly because of the educational subsidies; rural areas gained relatively (but not absolutely) more than urban areas; and households with children gained disproportionately, as one might expect.

Did the SP1 package cushion the effects of the external shocks? The answer to this may be found in Tables 10 and 11, where we have combined the effects of the shocks with those of the stimulus measures. The stimulus measures were modest relative to the macroeconomic shocks, and so on average they offset between a third and an eighth of the shocks, depending on whether one looks at only the direct effects, or the indirect and induced effects as well.

Yet there are some interesting patterns. Despite concerns about targeting, the stimulus measures substantially moderated the effects of the shocks on poor households, and we estimate that about half of those in the poorest three deciles actually gained (on average) because the stimulus measures outweighed the shocks (see

right-hand columns of Table 10). The stimulus measures also helped moderate the effects of the shocks quite substantially in the North and Northeast regions.

Table 9. Effects of Stimulus Package 1 on income, 2009

	Baseline	With SP1	% change	SP1: pensions	SP1: education	SP1: salaries
	<i>baht per capita per year</i>			<i>baht per capita per year</i>		
Decile						
1	12,836	13,501	5.2	172	414	79
2	21,875	22,563	3.1	199	378	110
3	28,285	28,976	2.4	198	348	145
4	35,063	35,748	2.0	177	334	175
5	42,966	43,657	1.6	197	303	191
6	52,856	53,527	1.3	162	290	219
7	66,685	67,359	1.0	185	238	251
8	87,008	87,692	0.8	169	225	290
9	121,895	122,550	0.5	139	198	318
10	290,707	291,323	0.2	182	163	270
Overall	76,012	76,684	0.9	178	289	205
Region						
Bangkok	158,736	159,381	0.4	198	203	244
Center	84,528	85,258	0.9	139	261	331
North	61,473	62,097	1.0	198	273	153
Northeast	52,225	52,890	1.3	190	333	142
South	80,923	81,600	0.8	171	314	192
Area						
Urban	117,743	118,422	0.6	179	242	258
Rural	57,333	58,002	1.2	177	311	181
Group						
Children	58,811	59,683	1.5	116	615	140
Women	77,621	78,307	0.9	189	290	207

Source: See text for explanation and sources.

Table 10. Combined effects of tourism and export shocks, and Stimulus Package 1, on income, 2009, by decile

	Baseline	Direct	Direct, indirect	Direct, indirect, induced	Direct	Direct, indirect	Direct, indirect, induced	Direct	Direct, indirect	Direct, indirect, induced
	<i>baht per capita per month</i>				<i>% change over baseline</i>			<i>% in group gaining, net</i>		
Decile										
1	1,025	1,074	1,069	1,059	4.7	4.2	3.3	81	80	67
2	1,747	1,784	1,757	1,730	2.1	0.6	-1.0	74	65	45
3	2,242	2,270	2,231	2,193	1.2	-0.5	-2.2	67	53	33
4	2,758	2,775	2,722	2,672	0.6	-1.3	-3.1	66	46	26
5	3,356	3,347	3,273	3,208	-0.3	-2.5	-4.4	60	35	18
6	4,077	4,041	3,943	3,858	-0.9	-3.3	-5.4	52	27	14
7	5,081	5,016	4,875	4,769	-1.3	-4.0	-6.1	48	20	11
8	6,608	6,489	6,299	6,157	-1.8	-4.7	-6.8	45	16	8
9	9,199	9,008	8,711	8,517	-2.1	-5.3	-7.4	38	13	6
10	21,661	20,910	20,232	19,792	-3.5	-6.6	-8.6	35	11	5
Overall	5,775	5,671	5,511	5,395	-1.8	-4.6	-6.6	57	37	23

Source: See text for explanation and sources.

Table 11. Combined effects of tourism and export shocks, and Stimulus Package 1, on income, 2009, by region, area, and group

	Baseline	Direct	Direct, indirect	Direct, indirect, induced	Direct	Direct, indirect	Direct, indirect, induced
	<i>babt per capita per month</i>				<i>% change over baseline</i>		
Region							
Bangkok	11,328	11,019	10,767	10,529	-2.7	-5.0	-7.1
Center	6,549	6,390	6,227	6,087	-2.4	-4.9	-7.1
North	4,977	4,967	4,868	4,760	-0.2	-2.2	-4.4
Northeast	4,204	4,173	4,098	4,021	-0.7	-2.5	-4.3
South	6,608	6,386	5,974	5,854	-3.4	-9.6	-11.4
Area							
Urban	8,777	8,593	8,380	8,204	-2.1	-4.5	-6.5
Rural	4,589	4,517	4,377	4,286	-1.6	-4.6	-6.6
Group							
Children	4,405	4,349	4,224	4,135	-1.3	-4.1	-6.1
Women	5,862	5,761	5,603	5,487	-1.7	-4.4	-6.4

Source: See text for explanation and sources.

8. Concluding Comments

The simulation results in Table 10 suggest that the shocks, net of the stimulus, could be expected to reduce incomes by, on average, 6.6% *relative to trend*. In other words, we would not expect incomes to fall by 6.6%; if they had been expected to rise by, say, 5%, then we might now see them fall by about 1.6% in absolute terms. Even this may be an overstatement; a recent study by Haughton and Khandker (2012) finds that real incomes did not fall during the 2008-09 recession for most groups in Thai society, with the main exception of young urban workers, many of whom were laid off when the export-based manufacturing sector was hit hard.

The direct effects hit immediately, but the indirect and induced effects occur only with lags. We do not know how long these lags are, but our implicit assumption is that the effects are complete within a year. This may be an overestimate, which would help explain why we may have overstated the total effects of the shocks.

We have concentrated on shocks that clearly originated outside Thailand – fewer international tourists, lower export demand. But we have not addressed the effect of the dramatic slowdown in investment. If this consisted purely of imports of machinery, it could be ignored in the short-run; but there was surely a drop in demand for domestic investment goods, including construction. Additional government spending on items not included in our analysis no doubt offset some of this shortfall in investment, but the implication for income distribution are unclear.

The story has a happy ending: exports rebounded very rapidly, and tourist numbers reached new record heights in 2010, a year in which GDP grew by over 8%. The government's finances were back in balance by late 2010.

However, this paper is more than just a case study, and there are several findings that we believe may have wider applicability. First, the three-layer macro-micro approach does appear to be useful in helping one to identify potential winners and losers. Had a model such as ours been up and running in late 2008 or early 2009, it could have helped the government identify which groups would be hurt by the shocks, and which policy measures were most likely to help offset those shocks. The scope for government policy may be particularly important for helping poor groups in the short-run, unlike the long run, where overall economic growth is likely to be the decisive factor (Dollar and Kraay 2001).

A second finding is that timely information is valuable. The insufficiency of timely and frequent data is well recognized. Khandker (2002), in his introduction to a series of case studies of the effect of the Asian financial crisis on households in Southeast Asia, notes that “even if governments ... were interested in tracking down the distributional impacts of the crisis and the likely consequences of the government policy actions, this was not possible because of the lack of appropriate information that could have facilitated such an exercise” (p.3). Our study used monthly data (on tourist numbers, exports), which was essential, because crises do not necessarily respect the calendar year. Although we then used annual data from the Socio-economic Survey in level 3 of our analysis, it would have been possible to do the simulation adequately using 2008 data, or even data for just some months of the year, since the Socio-economic Survey sample of about 3,500 households per month is relatively large.

There are a number of possible directions in which this work could go in the future: one could separate out the effects of price shocks (such as oil, rice, or rubber), and this could be done without developing a fully-fledged CGE model for level 2 of the analysis. It might also be useful to experiment by simulating the effects of other possible government interventions, with the goal of identifying possibly-useful instruments for combatting recession when it return again, as it surely will.

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