USING THE BALNCE SHEET APPROACH IN FINANCIAL STABILITY SURVEILLANCE:

Analyzing the Israeli economy's resilience to exchange rate risk

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BANK of ISRAEL

"Financial Instability, Supervision and Central Banks"

Helsinki, 7-8 June, 2007

Agenda

A. Background and Objectives

B. The Framework for Analyzing Exchange Rate Risk

C. Application to Israel

D. Summary and Conclusion

A. Background and Objectives

- Balance sheet approach (BSA)
- National balance sheet accounts (NBS)
- BSA, NBS and financial stability surveillance
- The progress in the world
- The status in Israel
- Contribution of this paper:
  - Developing an analysis framework
  - Application to Israel – 2005 vs' 1997, using new data

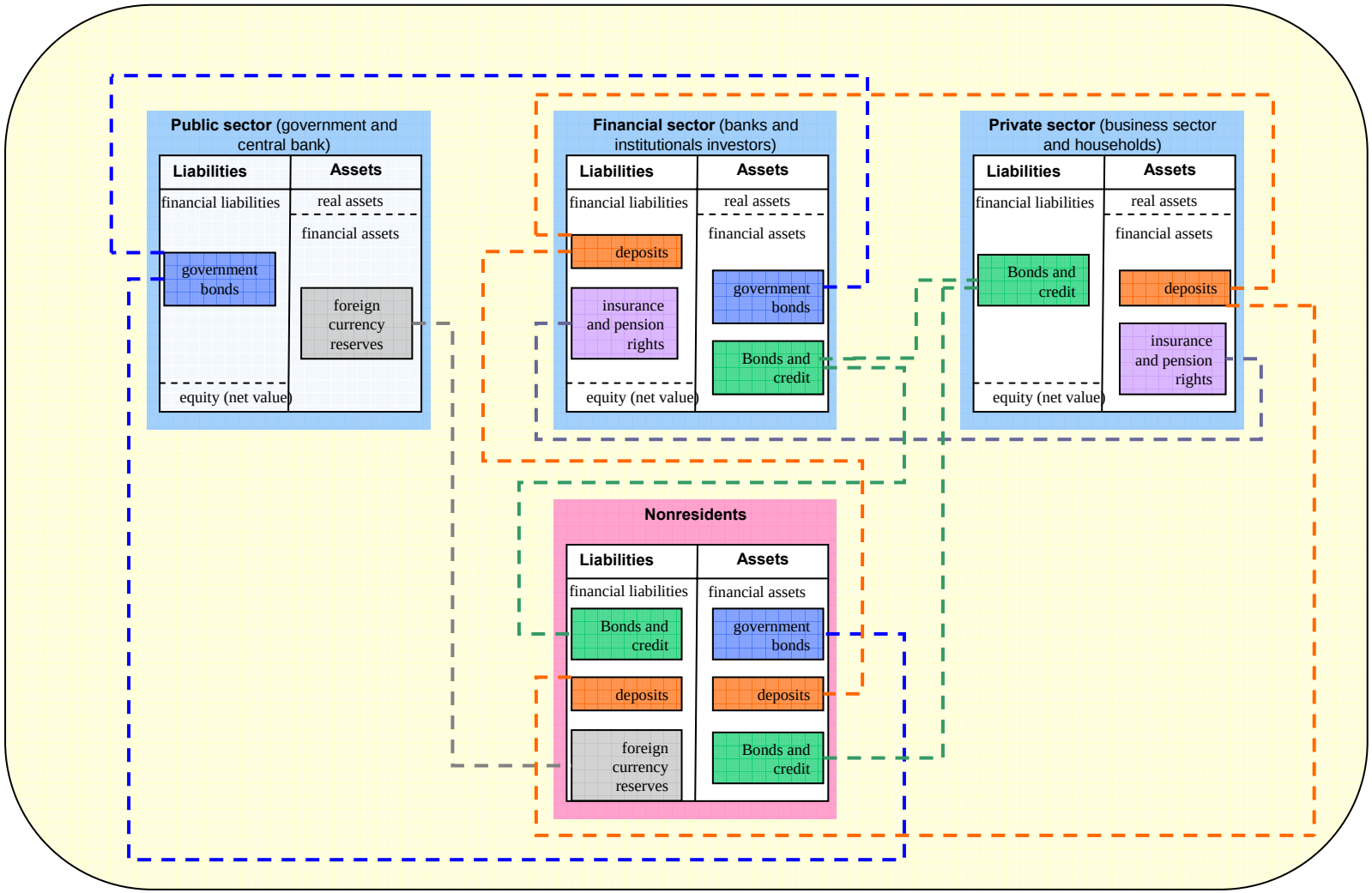
A. General Background and Objectives:
literature

3 important IMF papers:

- Allen et al. (2002), "**A Balance Sheet Approach to Financial Crisis".**
- Mathison & Pellechio (2006), "**Using the Balance Sheet Approach in Surveillance: Framework, Data Sources and Data Availability“.**
- Rosenberg et al. (2005), "**Debt-Related Vulnerabilities and Financial Crises: An Application of the Balance Sheet Approach to Emerging Market Countries".**

A. Background and Objectives:

National Balance Sheet Accounts



A. General Background and Objectives:

The progress in the world in recent years

- **The BSA is gaining prominence in the surveillance of financial stability.**
- **The national balance sheet data becomes more accessible and is used more for financial stability analysis.**
- **In spite of the improvement in the data infrastructure of the national balance sheet , it still does not match all aspects of financial stability analysis according to the BSA.**
- **In spite of the greater usage of BSA in financial stability analysis, there is no complete methodological framework.**

B. A Framework for Analyzing Exchange Rate Risk

5 Guiding Principles:

1. **The sectors –** dividing the economy into **6 local sectors**, which act with each other, as well as vis-à-vis abroad: Banks, Institutional Investors, Government, Central Bank, Business sector, Households.

2. **The Exposure** – Balance sheet/accounting exposure (surplus of assets over liabilities), which includes off-balance sheet items and items indexed to foreign currency (foreign currency balance sheet).

3. **Event method –** The analysis is based on the assumption that one of two extreme events occurs: exceptional depreciation or exceptional appreciation

4. **Contagion Channels** – Direct effects on the sectors exposed to exchange rate, **Indirect effects** on other sectors. Links between sectors create channels of contagion between them, mainly the "**credit risk channel**".

5. **Indices and parameters** – Indices of the exposure's magnitude, and of the damage's severity. Setting parameters which reflect the link between damage to the business sector and damage to the banks.

B. A Framework for Analyzing Exchange Rate Risk

Implementation:

- **Application to Israel** – Analyzing 2005 in comparison to 1997, in event of 20% depreciation or 20% appreciation.
- **Data Infrastructure** – combining national balance sheet data (CBS, 1995 and 2004) and foreign currency balance sheet data (BOI, 1997 and 2005).
- **Stages of analysis –** applying the guiding principles in the following stages:
  - Stage 1 – Identifying those sectors with significant exposure
  - Stage 2 – Quantifying the direct impact on exposed sectors
  - Stage 3 – Quantifying the indirect impact on other sectors (banks)
  - Stage 4 - Overall assessment

C. Application to Israel

Stage 1 – Identifying those sectors with significant exposure

The sectors exposure to exchange rate

	Exposure ($ billions) 1997	2005
Banks	1	1
Institutionals investors	0	7
✓ Government	-23	-28
Bank of Israel	16	26
✓ Business sector	-17	11
✓ Housholds	10	26
Eonomy	**-12**	**43**

We identify 3 sectors with significant exposure

C. Application to Israel

Stage 1 – Identifying those sectors with significant exposure

Exposure's magnitude of sectors significantly exposed to depreciation/appreciation (%)

	Total exposure (surplus of assets) as share of GDP		Total exposure (surplus of assets) as share of equity/net value	
	1997	2005	1997	2005
Government	-23	-23		
Business sector	-16	9	-31	6
Households	10	21	6	7
Economy (net total)	-12	35	-10	20

Exposed significantly to **depreciation** - government in both years, business sector in 1997.

Exposed significantly to **appreciation** – households in both years, business sector in 2005.

C. Application to Israel

Stage 2 – Quantifying the direct impact on exposed sectors

Direct damage's severity to financial strength of the business sector and households (%)

		Depreciation of 20%		Appreciation of 20%	
		1997	2005	1997	2005
Business sector	Loss in terms of GDP	-4.7			-2.6
	Loss in terms of equity	-6.1			-1.2
	Expected debt growth rate	11.8			None (debt is declining)
	Change in financial leverage (debt as share of total balance sheet)	55.4- ל51-מ			Unchanged - 38.9
Households	Loss in terms of GDP			-2.0	-4.3
	Rate of fall in value of financial assets			-1.4	-1.7
	Loss in terms of net value			-1.2	-1.4
	Growth of debt to net value (leverage)			from 25.7 to 25.9	Unchanged - 16.8

- The damage to the financial strength of **households** was not significant in 1997 nor in 2005.
- The damage to the financial strength of the **business sector** was significant in 1997 in event of extreme depreciation.

C. Application to Israel

Stage 3 – Quantifying the indirect impact on the banks

• We chose to concentrate on the link between the business sector and the banks

The indirect damage to the banks (%):

	Depreciation of 20%		Appreciation of 20%	
	1997	2005	1997	2005
Growth of problem loans as percentage of total credit risk	from 10.0 to 15.5	from 6.8 to 9.3	from 10.0 to 10.3	from 6.8 to 7.5
Expected loss as share of equity	-21	-10	-1	-3
Fall in capital adequacy	from 10.0 to 8.6	from 11.1 to 10.4	from 10.0 to 9.9	from 11.1 to 10.9

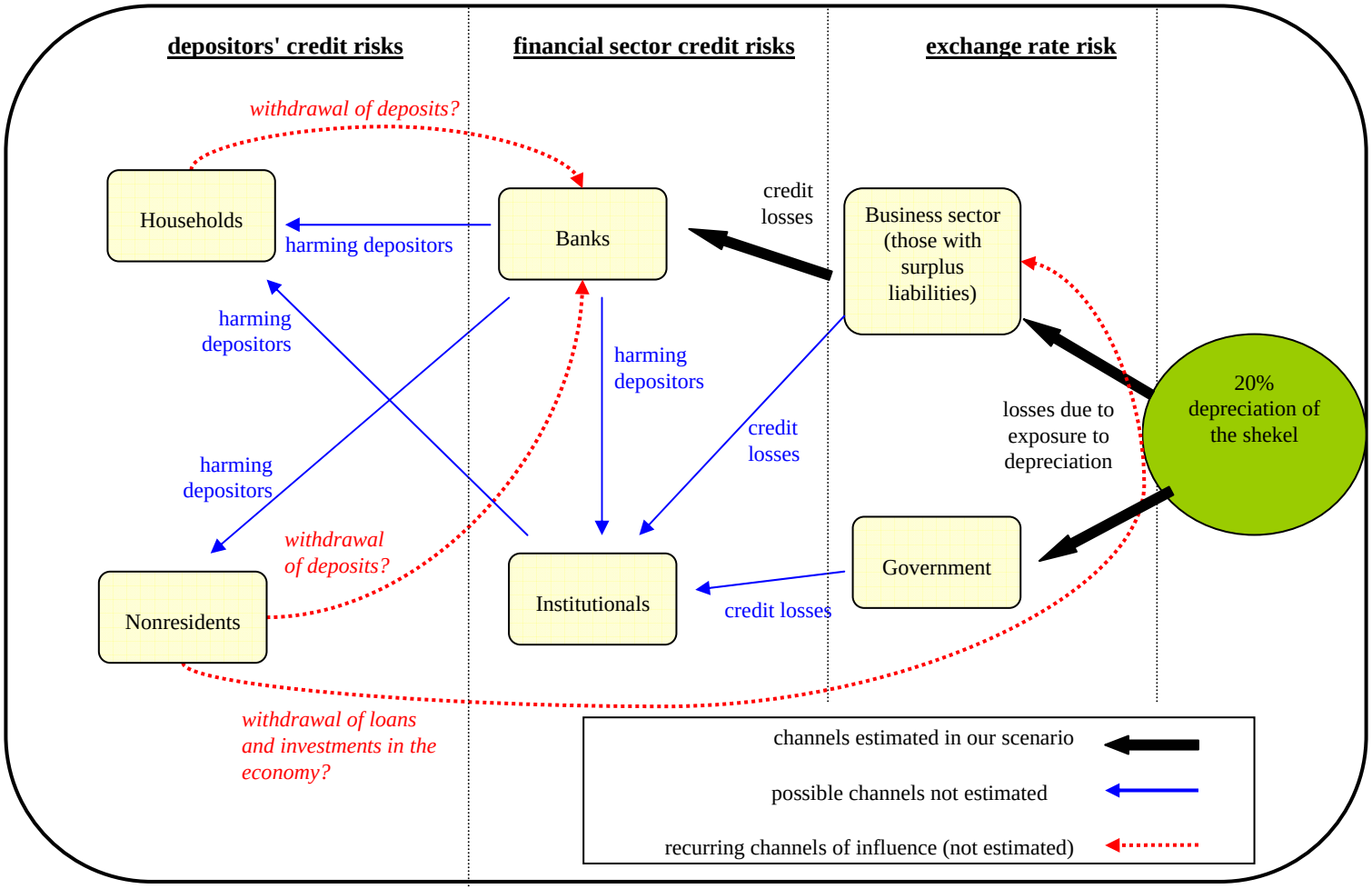
• The indirect damage to the banks from exceptional **appreciation** is low in both years.

• The indirect damage to the banks from exceptional **depreciation** was considerable in 1997, but decreasing till 2005.

C. Application to Israel

Stage 4 - Overall assessment

Example – description of the damage to the economy in extreme depreciation in 1997



D. Summary and Conclusion:
The Results

- **The BSA shows that between 1997 and 2005 the Israel economy's resilience to exceptional changes in the exchange rate increased:**
  - **To Depreciation – the economy was highly vulnerable in 1997 and far less in 2005.**
  - **To Appreciation – the economy is still resilient today, in spite of the large exposures of the business sector and households.**
- **The "traditional" approach would have resulted in completely different conclusions.**

F. Summary and Conclusion:
Insights

- **Important insights:**
  - **The economy/The Sectors**
  - **Exposure/Exposure's magnitude/Damage's severity – direct/indirect**
- **The analysis according to the balance sheet approach deepens the understanding of financial stability, systemic risks, and process of crisis, and we should increase it's usage.**
- **Necessary conditions: good data infrastructure (an improved national balance sheet) and framework for analyzing risks.**
- **In light of the key role (but not exclusive) of the banks in the resilience of the economy:**
  - **The importance of spreading risks in the financial system**
  - **The importance of diminishing financial risks in the business sector**
- **Financial liberalization and globalization increased exchange rate risk, but also acted to improve the economy's resilience to it.**
- **Further research: estimation of inter-sectoral relationships and stress-tests**

THANK YOU !

A. Background and Objectives:
The National Balance Sheet Accounts

Example – Main items from households balance sheet (NIS billion, current prices):

	2004	Banks	Institutionals Investors	government	Bank of Israel	Business Sector	Nonresidents
Total Assets	**1,941**						
Total non-financial assets	**514**						
Toatal financial assets	**1,426**	**354**	**481**	**35**	**38**	**497**	**23**
Cash and deposits	**358**	**336**		**3**	**8**		**10**
Insurance and pension rights	**478**		**478**				
Bonds	**70**	**0**		**28**	**30**	**4**	**7**
Shares	**483**	**14**	**1**			**464**	**3**
Other financial assets	**38**	**3**	**2**	**4**	**0**	**28**	**1**
Toatal Liabilities	**279**	**230**	**8**	**1**	**0**	**35**	**4**
Loans	**279**						
Other liabilities	**0**						
Net Value	**1,662**						

A. Background and Objectives:
The National Balance Sheet Accounts

Assets and Liabilities of Major Economic Sectors vis-à-vis Other Sectors, 2004 (NIS billions, current prices)

Liability holder / *Asset holder*	Banks	Institutionals investors	Government	Bank of Israel	Business Sector	Households	Total Israelis	Non-residents	Total financial assets (excl. shares)	Shares	Non-financial assets	Toatal assets
Banks		2	50	38	359	230	679	96	775	32	7	814
Institutional investors	85		278	5	48	8	424	16	441	60	1	502
Government	68	1		7	16	1	92	4	96	57	52	204
Bank of Israel	2	0	9		0	0	11	117	129	0	0	129
Business sector	131	20	59	40		35	285	131	415	82	578	1,076
Households	340	480	35	38	32		925	19	944	483	514	1,941
Toatal - Israelis	627	502	430	127	455	274		383		714	1,153	2,249
Nonresidents	108	1	134	0	79	4	327			261		
Total financial liabilities	735	504	564	128	534	279						
Toatal net value	78	-1	-360	1	542	1,662	1,922					
of which: Share's market value	49	22	-	-	841	-						
Toatal liabilities	814	502	204	129	1,076	1,941	2,249					

A. Background and Objectives:
The Foreign Currency Balance Sheet

Assets and Liabilities in foreign currency of Major Economic Sectors vis-à-vis Other Sectors, 2004 ($ billions, current prices)

Liability holder / *Asset holder*	Banks	Institutionals investors	Government	Bank of Israel	Business sector	Households	Total Israelis	Nonresidents	Total assets
Banks		1	1	0	27	3	32	31	63
Institutionals investors	1		0	0	1	0	2	5	8
Government	2	0		2	0	0	3	0	4
Bank of Israel	0	0	0		0	0	0	28	28
Business sector	16	0	0	0		0	16	46	62
Households	17	0	0	0	2		19	10	29
Total Israelis	35	1	1	2	30	3		121	
Nonresidents	27	0	31	0	21	0	78		78
Total liabilities	62	1	32	2	51	4		121	