The Solvency Ratio of External Debt (SRED) as an Indicator of Debt Crisis: The Case of Turkey

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Abstract

The objective of this research was to find a sound indicator to provide timely warnings to emerging economies of approaching debt crises. To achieve this, we used the solvency ratio of external-debt (SRED) as an analytical tool, by applying it to the case of Turkish external debt between 1980 and 2009. Analysis of our results indicated that the SRED was a powerful indicator of Turkey’s external debt crisis.

Key words: External debt, financial crisis, Turkish foreign debt, solvency ratio of external debt.

Jel classification: H0, H6.

1. Introduction, Definitions and Method

For an emerging (developing) economy which fails to compensate the desired expenditure by domestic resources available, when domestic saving rates occur low and/or a shortage of domestic borrowing instruments is present.

In most cases, a developing country borrows from external sources in order to invest in various infrastructure projects (import of capital intensive goods) and/or to finance balance of payment deficits. External debt is an exceptionally useful development tool provided it is specifically used to complement domestic project finance in such economies. It provides longer maturity than domestic debt to the borrower hence reduces the rollover risk and is considered safer. The Turkish economy, like similar emerging economies, is in constant need of large external borrowings, while being also dependent on short-term capital inflows.

Three possible definitions of external debt are as follows³:

1. External debt defined as “foreign currency debt”;
2. External debt as “debt issued in foreign countries and under the jurisdiction of a foreign court”;
3. External debt as “debt owed to non-residents”

Main compilers of statistical information on public debt such as BIS, Eurostat, IMF, OECD, Paris Club, UNCTAD and the World Bank adopt the third definition officially.

The Central Bank of Turkey (CBT) also defines external debt stock (EDC) as “the outstanding amount of those actual current, and not contingent, liabilities that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to non-residents by residents of an economy”⁴. As we have used the data compiled and monitored by the CBT and the under secretariat of Treasury (UT), this is also our definition. This definition is theoretically sensible because the term ‘resident’ refers to either

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³ Domestic And External Public Debt In Developing Countries, Ugo Panizza, UNDP Discussion Paper No. 188, March 2008, pp.4 (http://www.unctad.org/en/docs/osgdp20083_en.pdf). The key indicators of external debt are the External Debt Ratio to GDP, External Debt Service Ratio to GDP, or External Debt Service Ratio to Exports, and Ratio of Short Term Debt to Total Debt and Debt Service due to Total Debt.
an institution or individual residing regularly and running economic activities for over a year in a governed environment within a geographic territory, an ‘economy’.

It is important for a developing country to be able to keep repaying its external debt without arrears. If an economy’s external debt is serviced successfully, this obviously increases the credit rating of the country, which eases the terms and conditions of future lending. Successful debt service depends upon the following factors:

- Stable economy and sustainable GDP growth rate;
- Stable political governance;
- Surplus bearing balance of payments and national budget accounts;
- Borrowing, either for self-repaying infrastructure (power plants, telecommunication etc), or for productivity raising structural adjustment projects.

There is a common perception that rising external debt tends to weaken the economy. However, this really depends on whether GDP grows at a higher rate or not, and on whether the government borrows to cover a growing balance of payments deficit or to finance infrastructure and/or sectoral adjustment projects. The European Union, nevertheless, approaches the issue from a broader “public debt” perspective, and in a much stricter sense, by combining the risk of internal and external debt in a single basket. In sake of monetary stabilization and preventing crisis, E.U. economies have been limited to a public debt/GDP ratio of 60% and a deficit/GDP ratio of 3% by The Maastricht Treaty, which has also brought other restrictions and prerequisites. For poorer countries, this situation is frightening because their external debt burdens on their own are usually excessive, at about 50% of their GDP and 180% of export trade. This makes developing countries vulnerable to debt (repayment of principal and interest) crises that are closely related to external borrowing in the case of developing nations.

At this point, we should also define “crisis” more exactly. A debt crisis occurs when it is impossible for an economy to repay its overseas debts to non-resident lenders if its expenditure levels are not altered radically nor the terms of quittance are re-discussed. Unless the non-domestic debts can be paid at existing exchange rates, a currency crisis arises out of it. Debt crises and currency crises occur together often, because most overseas debt agreements involve the lenders’ currency.

Having defining external debt and crisis, our remaining undefined term is the solvency ratio (SR). Along with other ratios, SR is used to measure a company in terms of its ability to pay long-term debts. It compares the company’s after-tax income, free of non-cash depreciation expenses, to its total liabilities. This ratio measures how likely the company can maintain paying its liabilities. The measure is usually calculated as follows:

\[
\text{Solvency Ratio} = \frac{\text{After Tax Net Profit} + \text{Depreciation}}{\text{Long Term Liabilities} + \text{Short Liabilities}}
\]

For the purposes of this research, however, we have simply applied the SR formulation to a country (Turkey) rather than a company. Hence, instead of “after tax profit” we have used Turkey’s “current account” plus “capital account” derived from the balance of payments. Our main purpose is to monitor Turkey's capacity to meet its external debt obligations and see whether the ‘Solvency Ratio of External Debt’ (SRED) formulation is

5 http://www.g24.org/losergva.pdf
7 http://www.investopedia.com/terms/s/solvencyratio.asp
able to warn of bottlenecks and/or possible default situations. Our formulation of SRED is as follows:

\[
SRED = \frac{Current\ Account + Capital\ Account}{Interest\ payments + Principal\ Payments}
\]

SRED is calculated for the repayments of interest and principal payment for each year. A SRED value close to 1 means that repayment ability increases while a value of 1 or greater denotes increasing debt servicing ability whereas a value of less than 1 indicates that a hard currency shortage is approaching. In this case, the developing country’s government, specifically the Treasury, needs to tap international capital markets for new loans (assuming that the reserve account is insufficient to cover the deficit).

2. Literature Review

In the current theoretical literature, debt servicing ability is sometimes referred to as ‘external sustainability’ which may also refer to ability to pay current and future external debts. We have chosen to use the term “debt servicing ability” instead. Research on measuring debt servicing ability has remained at inadequate amount at this date. Below, we have compiled the most cited studies.

G. Feder, together with E. Just (1977), 7 and later K. Ross (1981), examined various economic variables that measure economies in terms of capacity to service debts. Feder and L. Uy (1987) estimated a logit model to measure creditworthiness using various variables. J. Eaton and M. Gersovitz (1981) applied a model-based approach to analyze the issue. They used various observable borrower characteristics, such as population, real GNP, nominal GNP, imports/real GNP, real level of debt/public institutions and one dummy variable. C. Donogh (1982), and D. Yener and F. Mambrato (1984), investigated debt capacity from different perspectives. C. Donogh’s explained debt capacity and its application to growth models before examining some empirical studies, such as logit, probit, discriminant and principal components analysis. D. Yener and F. Mambrato analyzed six ratios and ranked GDP growth rate as the most important variable in their early warning model. R.W. Cline (1984), and Karayalcin and T. Temel (1988) used a logit model to verify the influence of key variables affecting debt rescheduling. Their findings showed that some variables used in the study occupied a notable part in evaluating the developed countries’ capacity to service debts.

Most recent research examines country risk ratings. These studies used selected macro-economic indicators for the calculations such as real exchange rates, reserves over M2, imports, and short-term debt level. For example, Apoteker and Barthelemy (2001) analyzed

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the genetic algorithms and financial crises in Emerging Markets in terms of country risk levels without an equation or a thresholds model. They used five major fundamental balance charts, including external debt. Yim and Mitchel (2005) examined the ability of a relatively new technique, hybrid ANN’s, to predict country risk ratings. Their study suggests that a hybrid network may be a useful tool for country risk analysis.

According to International Monetary Fund (IMF) and the World Bank (2001), the debt crises occurred in less developed countries (LDCs) are mainly caused by issues of solvency rather than liquidity of cash reserves. For this reason, they believe that developmental issues cannot be understood fully by traditional indicators of level of dependency on debt or accounting techniques used in Balance of Payment (BoP). Compared to approaches oriented to BoP, issues of solvency require more specificity to monitor fiscal and monetary policies of an economy.

3. A Brief Historical Perspective on the Financial (Debt and Currency) Crisis in Turkey

Although external borrowing and short-term capital inflows have several positive effects, they may lead to financial crises. Thus, most of the financial crises stemming from emerging markets, like the Mexican crises of 1982 and 1994-5, the Asian crisis of 1997-8, the Brazilian and Russian crisis of 1998-9, the Turkish Crisis of 2000 and the Argentinean and Uruguay crisis of 2001-2, all have roots in inappropriate monetary policies. These crises also had contagious effects on emerging economies. For example, following the Asian crisis, capital inflows to Turkey slowed down rapidly, halving economic growth. Similarly, after Mexico’s moratorium in 1982 stagnation arose with hyperinflation and devaluation, followed by regression in wealth distribution which all cost a decade to Latin American countries.

On 24th January, 1980, Turkey took decisions to introduce radical changes to its export-import regime and exchange rate policies. OECD countries raised new loans of around USD1.000 to help reschedule Turkey’s external debt. During this period, the IMF provided USD300 million, the IBRD USD210m, and the EEC USD100m.

The next major crisis was seen in 1991, when the Central Bank’s monetary policies combined with the Gulf crisis to create a huge current account imbalance of USD2.3 billion. The crisis returned in 1994, in a more intense form, albeit short-lived. In the summer of 1992 and 1993, turmoil in European capital markets sparked expectations of a devaluation of the Turkish Lira, which led to capital flight of USD 4.2 billion from Turkey.

By 1998, Turkey’s economy was paying for the negative burden of the early 1980s and 1990s. Inflation reached 100 percent, and public debt increased considerably, creating serious domestic debt roll-over risks. 1999 was another bad year for Turkey, as the 17th August earthquake hit the industrial zone of the country and crude oil prices peaked to approximately USD120 per barrel. In mid-2000, rumors spread about the solvency of three commercial banks, and two state banks also said to have incurred heavy losses. This contributed to an increase in domestic borrowing so that, an explosion in the current account deficit to around USD10 billion, and a USD3 billion portfolio investment outflow, triggered a further crisis at the end of 2000.

According to M. Stamer’s (2008) report about the country risk of Turkey, the significant effects of global financial crisis are already visible in Turkey, as stock markets’

17 http://kazgan.bilgi.edu.tr/docs/1990_sonrasi_yilfarda_Turkiye.doc
tumble and Lira is in great depreciation since September 2008. This report also considers Turkey one of the most vulnerable economies to effects of global crisis because of Turkey’s great demand for external financial sources and dependency on short-term inflows of capital. He expects the economic downturn to be sharp and soon, also expecting real GDP growth of just 1.2% or so in 2009, with a rising number of insolvencies due to the current economic negativities. Stamer also sees IMF as a strong anchor that can maintain investor confidence for Turkey with a stand-by agreement which also helps in meeting the needs of external financing. However, failure in securing an agreement would cause a serious banking crisis in Turkey by destroying the investor confidence.

4. Results of the SRED Series

In order to demonstrate the effectiveness of the SRED as an indicator, we compiled time series data from 1980 to 2009 (Table 4.1.).

<table>
<thead>
<tr>
<th>Years</th>
<th>Current</th>
<th>Capital</th>
<th>Interest</th>
<th>Principal</th>
<th>SRED</th>
</tr>
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<tbody>
<tr>
<td>1980</td>
<td>-3,408</td>
<td>672</td>
<td>-1,138</td>
<td>-1,628</td>
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<tr>
<td>1981</td>
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<td>899</td>
<td>-1,143</td>
<td>-1,289</td>
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<td>1982</td>
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<td>280</td>
<td>-1,565</td>
<td>-1,603</td>
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</tr>
<tr>
<td>1983</td>
<td>-1,923</td>
<td>883</td>
<td>-1,511</td>
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</tr>
<tr>
<td>1984</td>
<td>-1,439</td>
<td>73</td>
<td>-1,586</td>
<td>-1,907</td>
<td>0.39</td>
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<tr>
<td>1985</td>
<td>-1,013</td>
<td>1,065</td>
<td>-1,753</td>
<td>-2,208</td>
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<td>1986</td>
<td>-1,465</td>
<td>2,124</td>
<td>-2,134</td>
<td>-2.173</td>
<td>-0.15*</td>
</tr>
<tr>
<td>1987</td>
<td>-806</td>
<td>1,891</td>
<td>-2,387</td>
<td>-2.687</td>
<td>-0.21*</td>
</tr>
<tr>
<td>1988</td>
<td>1,596</td>
<td>-958</td>
<td>-2,799</td>
<td>-3,927</td>
<td>-0.09*</td>
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<tr>
<td>1989</td>
<td>938</td>
<td>780</td>
<td>-2,907</td>
<td>-4,023</td>
<td>-0.25*</td>
</tr>
<tr>
<td>1990</td>
<td>-2,625</td>
<td>4,037</td>
<td>-3,264</td>
<td>-3.938</td>
<td>-0.20*</td>
</tr>
<tr>
<td>1991</td>
<td>250</td>
<td>-2,397</td>
<td>-3,440</td>
<td>-4.070</td>
<td>0.29</td>
</tr>
<tr>
<td>1992</td>
<td>-974</td>
<td>3,648</td>
<td>-3,215</td>
<td>-4.871</td>
<td>-0.33*</td>
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<td>1993</td>
<td>-6,433</td>
<td>8,903</td>
<td>-3,462</td>
<td>-4.412</td>
<td>-0.31*</td>
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<td>1994</td>
<td>2,631</td>
<td>-4,257</td>
<td>-3,311</td>
<td>-5.448</td>
<td>0.19*</td>
</tr>
<tr>
<td>1995</td>
<td>-2,339</td>
<td>4,565</td>
<td>-3,400</td>
<td>-5.667</td>
<td>-0.25*</td>
</tr>
<tr>
<td>1996</td>
<td>-2,437</td>
<td>5,483</td>
<td>-3,401</td>
<td>-5.685</td>
<td>-0.34*</td>
</tr>
<tr>
<td>1997</td>
<td>-2,638</td>
<td>6,969</td>
<td>-3,795</td>
<td>-6.095</td>
<td>-0.44*</td>
</tr>
<tr>
<td>1998</td>
<td>2,000</td>
<td>-840</td>
<td>-3,869</td>
<td>-8.174</td>
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<tr>
<td>1999</td>
<td>-925</td>
<td>4,829</td>
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<td>11383</td>
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</tr>
<tr>
<td>2000</td>
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<td>9,584</td>
<td>-4,825</td>
<td>12746</td>
<td>0.02*</td>
</tr>
<tr>
<td>2001</td>
<td>3,760</td>
<td>-14,557</td>
<td>-5,497</td>
<td>13489</td>
<td>0.57</td>
</tr>
<tr>
<td>2002</td>
<td>-626</td>
<td>1,172</td>
<td>-4,395</td>
<td>17402</td>
<td>-0.03*</td>
</tr>
<tr>
<td>2003</td>
<td>-7,515</td>
<td>7,162</td>
<td>-4,544</td>
<td>28468</td>
<td>0.01*</td>
</tr>
<tr>
<td>2004</td>
<td>-14,431</td>
<td>17,702</td>
<td>-4,312</td>
<td>37650</td>
<td>-0.08*</td>
</tr>
<tr>
<td>2005</td>
<td>-22,198</td>
<td>42,660</td>
<td>-5,010</td>
<td>44282</td>
<td>-0.42*</td>
</tr>
<tr>
<td>2006</td>
<td>-32,193</td>
<td>42,689</td>
<td>-6,322</td>
<td>49189</td>
<td>-0.19*</td>
</tr>
<tr>
<td>2007</td>
<td>-38,311</td>
<td>48,707</td>
<td>-7,477</td>
<td>64525</td>
<td>-0.14*</td>
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<tr>
<td>2008</td>
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<td>33,547</td>
<td>-8,477</td>
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<tr>
<td>2009</td>
<td>-13,853</td>
<td>6,115</td>
<td>-7,248</td>
<td>-61577</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Source: Compiled by the writers from Treasury, Central Bank and Ministry of Finance data

* denotes warning indicator regarding Solvency Ratio of External Debt.
As can be seen from Table 4.1., the SRED was positive in 1980 and the following years, although the situation was already deteriorating. This indicates that there were external debts servicing difficulties. The SRED recovered in 1985, before falling into negative territory between 1985 and 1990. In 1991, a sudden turn up than a sudden down in 1992 can be observed. 1994 is another positive year. 1995-1999 seems to be hard currency shortage is approaching, when the ability to pay external debt decreased to -0.34. However, in 2000, the SRED fell sharply again to 0.02, coinciding with the crisis years of 2000 and 2001, as outlined above. Overall, the SRED indicates that 1980-84, 1991, 1994 and 2000-1 were the years where Turkey’s ability to service her external debt was severely disrupted. Turkey's external debt in 2000’s image "growing debt and imports, solvency ratio is declining" in this context. This situation can be seen already SRED series. This is the correct way to Turkey's crisis can be taken as an indicator.

5. Conclusion
This study aimed to find a new indicator of financial and debt crises. These target was constructed by searching a logical way. Hence the way described in earlier chapters and explained the valid reason be indicators of solvency ratio

This study shows that, in the case of Turkey, a simple model SRED can clearly indicate a country’s debt servicing capability. This result suggests that, by monitoring its tendency (whether it is moving towards 1 or 0) we can make valid projections into the future.

The basic shortcoming of our current SRED model is because domestic indicators such as assets, debts were not taken into account and net present value of debt stocks –both domestic and external, are not considered in this model. Instead, the model was solely dependent on BoP data.

In the next step working, we would like to measure the SRED by using leverage ration. This idea is also exciting to applying for literature.

References


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