Memorandum on Souva's Contract-Intensive Money (CIM) variable

Definition

Clague, Knack, Keefer, and Olson (1999: 188)[1] "define contract-intensive money (CIM) the ratio of noncurrency money to the total money supply, or (M2 – C)/M2, where M2 is a broad definition of the money supply and C is currency held outside banks. Fortunately, there are data on the quantities of both currency and M2 for almost all countries. (fn3)"

Footnote 3 reads: "Currency comes from line 14a of International Financial Statistics, "currency outside deposit money banks." It does not include foreign currency in circulation, since there are no reliable measures of this, although foreign currency deposits in financial institutions, which are easily measured, are included in M2. M2 is defined by IFS as the sum of money and quasi-money, or the sum of lines 14a (currency outside banks), 24 (demand deposits), 15 (time deposits), and 25 (time and savings deposits, including foreign-currency deposits of resident sectors other than central government). We cannot control for variations in the mix of different types of money in M2. For example, we would expect that where the incentives to hold currency increase, so also do incentives to substitute out of time deposits and into demand deposits. However, all components of M2, including time and demand deposits, share the critical feature that they rely on economic actors to surrender control over their money to third parties for some period of time."

Issues in Creating CIM from the IMF's IFS

a. **How should one define/obtain M2?**

Clague et al (1999) provide two definitions of CIM.

CIM = (M2 – C) / M2
M2 = (Line 14a + Line 15 + Line 24 + Line 25)
C = Line 14a

1. Measurement strategy 1: define M2 as the sum of Line 14a + Line 15 + Line 24 + Line 25

2. Measurement strategy 2: define M2 as Lines 34 and 35 in the IFS data (see below)

Logically, these definitions are the same, but below I show that it is possible to create M2 in two different ways and that these two ways are not perfectly identical.

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[1] Clague, Christopher, Philip Keefer, Stephen Knack, and Mancur Olson. 1999. Contract-Intensive Money: Contract Enforcement, Property Rights, and Economic Performance. Journal of Economic Growth 4: 185–211.

b. **Are ‘sub-lines’ included?** If one follows measurement strategy one (for M2), a question about sub-lines arises. For example, should one include line 25L? The short answer to this question, I believe, is yes, otherwise one will not have data on the United Kingdom. That is, line 25L contains data on only the United Kingdom and Sweden, and line 25 has no data on the United Kingdom. In most cases, however, it appears that sub-lines are ‘breakouts’ or further elaborations on the primary line; therefore, including them is like double counting.

c. **What should be done with missing values?** If one follows measurement strategy one (for M2), it is necessary to think about missing values. In general, I think it is fair to assume that missing values are just that, missing. However, line 15 seems to be an exception to this rule. If one does not recode missing values for line 15 to zero, then a majority of cases are omitted. This is not a strong justification, just an intuition that missing values for line 15 should be recoded to zero. Below I give a second, stronger justification.

d. **Should one include both …zf and …zk values?** In the IFS, a state may have data reported for one of two series, ...zf or ...zk. ZF is straight IMF data processing. ZK data seems not to be processed by the IMF, only by the reporting states, but the states are using the same accounting procedures as the IMF. Because the accounting procedures are the same, the data should be comparable. For some state-years, there is both ZF and ZK data. They are close to each other but rarely identical. For this reason, I think that one should not combine ZF and ZK data, though I will note that the correlation between the two series is extremely high.

Creating CIMv1

Step 1: Obtain lines 14a, 15, 24, and 25 from the IFS

Step 2: Recode line 15 missing value to 0.

Step 3: Create M2v1, where M2v1 = line14a + line 15 + line 24 + line 25

Step 4: Create CIMv1
CIMv1 = (M2v1 – line 14a) / M2v1

Creating CIMv2

Step 1: Obtain lines 14a, line 34 and line 35.

The IFS says that lines 34 and 35 are the sum of lines 14a, 15, 24, and 25.

Step 2: Create M2v2, where M2v2 = line 34 + line 35

Step 3: Create CIMv2
CIMv2 = (M2v2 – line 14a) / M2v2

Comparing CIMv1 and CIMv2

They correlate at .9758.

```
sum  cimv1 cimv2

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       cimv1 |      7193    .7587971    .1816822   .1073446          1
       cimv2 |      6811    .7595665     .174302   .1750419          1
```

Note 1: If one did not recode line 15 missing values as zero, then cimv1 would only have a few observations.

Note 2: CIMv1 has more observations than CIMv2 because lines 34 and 35 are missing for 575 European (Euro) states just prior to the introduction of the Euro. As that implies CIMv2 has data on some observations that CIMv1 does not have.

Note 3: I think that CIM = 1 is problematic. Almost all of these cases occur in the first one or two years of a state's entry into the IFS, suggesting that the reporting is not quite as accurate as it should be. Further, when these states transition away from a score of 1, it is usually a large change, relative to other changes in the data. Below, I make that assumption that it is not possible for line14a to equal zero (that applies to 26 cases in the data). That eliminates the possibility of CIM being equal to 1.

Mark's CIM variable

cimmark = CIMv2
replace cimmark = CIMv1 if CIMv2 = = .
replace cimmark = . if line14a = = 0

This variable ranges over the years 1948-2008.

```
sum cimmark

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     cimmark |      7120    .7600388    .1724688   .1750419   .9999999

sum cimmark, d

                           cimv2v1
-------------------------------------------------------------
      Percentiles      Smallest
 1%     .2756636       .1750419
 5%     .4046127       .1767373
10%     .4965703       .1775497       Obs                7120
25%     .6605613       .1792257       Sum of Wgt.        7120

50%     .8065296                      Mean           .7600388
                        Largest       Std. Dev.      .1724688
75%     .8982224       .9999119
90%     .9411286       .9999176       Variance       .0297455
95%     .9560426       .9999244       Skewness      -.9649447
99%     .9962282       .9999999       Kurtosis       3.277411
```

Final Notes

a. 'cimmark' is missing scores for a fair number of Euro zone states for 1998 and 1999. If one uses the ZK series, it is possible to obtain scores for these states for these years. The reason I do not include them in my base variable is that ZK values are not identical to ZF values when there are overlapping years, as discussed above. While the two series are generally very close, suggesting it is not too problematic to pick and choose when to add ZK scores to fill-in, they are not identical so I played it safe.

b. If you would like other versions of the CIM measure, please let me know.