

# **Advanced development economics: Applied macroeconomic and policy analysis**

**January 2018**

## **MARKING GUIDELINES**

### **Introductory comments**

To evaluate the essays it is vital to recognize that students are likely to structure their answers quite differently. In doing so, they are also likely to make different substantive points. So, the content of essays will vary. This is perfectly acceptable – i.e., good answers, even top grades, will not look the same.

As a result, rather than provide “a” single model answer, the following marking guidelines seek to:

- (a) broadly describe the profile associated with different grades; and
- (b) identify key points (plus associated evidence, examples, and references), based on the curriculum, that candidates might be expected to cover in their answers. Note that the key points are not comprehensive, but it would be difficult to achieve a top grade without covering a reasonable number of them in some way.

In addition, it is important to highlight that one of the main overall learning objectives of the course was to foster critical thinking among the students – i.e., to be able to think for themselves and to recognize strengths and weaknesses of alternative approaches to economic analysis. As a result, answers that demonstrate these capacities should be evaluated more positively.

### General profile of passing grades (informal description)

Grade	Description
2	Shows basic knowledge of the curriculum. Able to communicate at least one key point, with supporting evidence. Structure of the essay may be weak and / or somewhat unclear. Major gaps or misunderstandings may be present.
4	Shows reasonable knowledge of the curriculum and adequately covers one or more key points. However, important gaps in terms of coverage or misunderstanding of evidence or ideas may be found. Candidate is able to communicate and structure ideas with reasonable clarity. Some aspects of the questions may be given inadequate treatment.
7	Shows reasonable knowledge of the curriculum and adequately covers more than one key point. Ideas are communicated in a structured fashion and relevant evidence is used as appropriate. Some gaps in terms of use of evidence or coverage of key ideas may be identified. All aspects of the question are addressed.
10	Shows good knowledge of the curriculum and covers various key points in depth. Ideas are well structured and relevant evidence is used consistently and appropriately. Few gaps in terms of evidence or coverage are found. Adequate references are provided. All aspects of the question are addressed.
12	Excellent in all regards, reflecting a high academic standard. Essay is thoughtful (shows critical thinking), is clear and well structured, and comprehensively covers many key points / issues. A full set of references is provided.

**Question 1: “Drawing on the IMF’s Data Quality Assessment Framework (as described here: <http://dsbb.imf.org/pages/dqrs/DQAF.aspx>), provide evidence of concerns with the quality of macroeconomic data provided by (at least some) developing countries. Briefly reflect on what you consider are the most important ways in which the quality of (macro)economic data can be enhanced in developing countries.”**

### *General comments*

Concerns around the quality of macroeconomic statistics are relevant from both a practical (policy) and research point of view. This issue has been recognised by the IMF and has often come in to focus following economic crises (in emerging markets), where a lack of timely, relevant and accurate information was found to have impeded the early diagnosis and resolution of problems (e.g., Tequila crisis in Mexico, discussed in Boughton, 2012).

### *Key points*

- As indicated in the question, a useful starting point for *practical* evaluation of data quality is the IMF’s ‘Data Quality Assessment Framework’ (DQAF), which is intended to provide a structure for assessing existing practices against best practices, including internationally accepted methodologies.
- The DQAF (see: [http://dsbb.imf.org/images/pdfs/dqrs\\_Genframework.pdf](http://dsbb.imf.org/images/pdfs/dqrs_Genframework.pdf)) sets out both general preconditions and core dimensions of quality. The former refer to the legal and institutional environment, adequate resources, monitoring relevance and management. The latter refer to assurances of integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility.
- The DQAF framework provides a useful structure for evaluation. The table below draws on the elements of the DQAF to identify a number of examples of (common) data quality ‘failures’ – i.e., areas where countries have often failed to meet reasonable standards.

Criteria	Elaboration	Example(s) of failure
General preconditions	The production of official statistics requires a suitable legal framework (i.e., to establish responsibilities and authorities) as well as sufficient financial and human resources.	A critique of fiscal austerity imposed under structural adjustment programmes in SSA during the 1980s and 1990s is that statistics agencies were weakened. Various specific examples are cited in Jerven (2013).
Assurances of integrity – impartiality	Official statistics should be produced on an independent basis and thus be free from political and other influences (biases).	Political incentives to manipulate official statistics are widespread, especially where statistics are pertinent to election outcomes or specific performance targets. The behaviour of Argentina’s consumer price index (set out in Cavallo, 2013) is one example of how political influence may have biased the series.

Criteria	Elaboration	Example(s) of failure
Methodological soundness – use of international methods	Official statistics should be produced in accordance with (latest) international standards and compilation methods.	<p>The methodological basis for producing core macroeconomic statistics varies across countries. As the IMF's WEO Country Data Documentation shows, numerous developing countries rely on an old (outdated) version of the UN's System of National Accounts (e.g., SNA 1993) or even have their 'own' system.</p> <p>There are very large differences in how countries calculate core price indexes, such as the consumer price index. For example, Mozambique's CPI is based on data from only three cities.</p>
Methodological soundness – scope	The scope or coverage of national account are broadly consistent with internationally accepted standards, guidelines, or good practices	<p>This is a major challenge where countries do not update to the latest versions of the national accounts and/or where the informal sector is large.</p> <p>One example refers to the national accounts revision undertaken by Nigeria in 2013 – prior to then the classification of the ICT sector had excluded the contribution of mobile telephony.</p> <p>As a result of the above, accounts may not always be very comparable.</p>
Accuracy and reliability – source data	Official statistics should be based on adequate and appropriate source data.	<p>Where national accounts base years are not revised on a regular basis, weights for prices become outdated and new activities will be excluded (see above). In addition, in developing countries, accurate measurement of the informal and agricultural sectors (which is often a large % of the economy) is highly problematic and demands careful treatment via bespoke surveys. However, as AfDB (2013) note, these surveys are not regularly undertaken.</p>
Accuracy and reliability – sound statistical techniques are used	Statistical methods used to produce macroeconomic aggregates and undertake revisions should be sound and transparent	<p>Methods used by agencies are not always well documents or clear. The paper by Wu (2007) outlines concerns around opaque revision of China's GDP that are relevant in this regard.</p>

Criteria	Elaboration	Example(s) of failure
Servicability -- timeliness	Official statistics should be made available on a timely basis (e.g., in line with internationally accepted dissemination standards).	There are very large differences in dissemination speeds. This is exemplified by the IMF's WEO Country Data Documentation. For example, as at April 2016, the latest CPI data available for the USA was from 2015 but in Senegal it was from 2011 and in Eritrea it was from 2009.
Servicability -- consistency	Statistics are consistent or reconcilable with those obtained through other data sources and/or statistical frameworks; and preliminary and/or revised /updated data are clearly identified	Large revisions to official statistics are commonly found in developing countries, suggesting that initial estimates are inaccurate. This can be shown through examination of IMF Article IV assessments.
Accessibility -- availability	Official statistics (and meta-data) should be easily accessible to all relevant users (at the same time).	Concrete examples from the websites of individual statistics agencies can be cited here.

- With respect to what can be done to enhance the quality of macroeconomic statistics, what is deemed important depends on the diagnosis of the problem. However, some relevant points include:
  - ensuring that preconditions, including institutional independence and resources are adequate;
  - ensuring compliance with international best practice and publication of regular (to a schedule) core statistics. (Perhaps clearer benchmarking of countries in this regards may help spur action).
  - paying greater to sources of uncertainty and their communication (see Manski, 2014); and
  - taking advantage of new technologies – e.g., satellite technologies can be used efficiently to estimate crop performance as well as city growth; and in many countries online prices (and transactions) can be used to monitor activity in real-time thereby serving as useful triangulation devices

**Question 2: “Why might developing countries adopt inflation-targeting? What evidence is there to support its superior performance relative to other monetary and exchange rate policy regimes?”**

*General comments*

- Note this is a two-part question and each part should be given approximately equal treatment (weight)
- In terms of general framing, this question speaks to the choice of an appropriate (effective) nominal anchor to ensure price stability. Students should understand this link.
- Evidence on the relative effectiveness of different nominal anchors (monetary and exchange rate arrangements), however, is controversial in part due to the difficulty of dealing with endogeneity – e.g., adoption of inflation-targeting may be driven by internal economic and institutional changes that are more crucial to (enhanced) price stability than inflation-targeting per se

*Key points on adoption of inflation-targeting*

- The need for a nominal anchor arises from the nominal indeterminacy problem – there is no ‘natural’ level or path for the economy-wide price level; and most plausible models of price setting are forward-looking in nature. As a consequence, some way to tie the hands of the authorities (Central Bank / government) to avoid pursuing unexpected policy shocks is required.
- Various solutions to the nominal indeterminacy problem have been suggested, and these typically map to different choices of a nominal anchor (one example can be derived from the equation of exchange [lecture A2, slide 12]).
- Historically, the nominal indeterminacy problem has been solved either via commodity money (gold) or via a system of fixed exchange rates (Bretton Woods). Under a flexible exchange rate, targeting the growth of monetary aggregates has been popular and remains used by many developing countries. But since the 1990s, starting with advanced economies such as New Zealand, inflation-targeting has been used as a preferred alternative in some countries.
- Inflation-targeting is a monetary policy regime in which the target for some definition of core inflation serves as the nominal anchor. The main instrument used to achieve the target is (typically) the Central Bank overnight interest rate.
- Motives for adopting inflation-targeting vary. On the one hand it reflects a fundamental choice to anchor prices via domestic monetary policy rather than external monetary policy (as per an exchange rate peg). As such, it is consistent with a flexible exchange rate, which has been shown (Cavallo, 1999) to be advantageous for countries more exposed to real shocks.
- A further motivation for adopting inflation-targeting is deficiencies associated with targeting the growth of monetary aggregates. These include the breakdown in the link between the instruments of monetary policy (e.g., growth of base money; interest rates) and growth of broader money (M3) which often arises in financially developed economies, as well as countries with significant private capital inflows. Also, inflation-targeting is typically a very direct and effective way to communicate the intentions of authorities

with market participants (it provides a high focus) and make itself accountable for its activities (e.g., by adopting rule-based behaviour).

- The above points suggest that there may be (pre)conditions under which adoption of inflation-targeting may be not so advisable/desired. These include a lack of credibility of the Central Bank to be able to pursue independent policies (e.g., high risks of fiscal dominance) and weakly effective monetary policy tools – i.e., a situation in which interest rate movements do not have a predictable/significant impact on broad economic activity and prices (e.g., low interest-rate pass through). Note, however, that the extent to which these conditions need to be met before adopting inflation-targeting is debated. Some argue (e.g., Batini et al., 2005) that inflation-targeting can provide a means to *establish* institutional credibility.
- A related discussion is that inflation-targeting tends to prioritize price stability, which may well come at a cost of (real) output volatility, including unemployment (short run Philips curve).

#### *Key points on evidence for enhanced performance of inflation-targeting*

- The key papers from the syllabus that address this issue include Batini et al. (2005), Khan (2011) and Thornton (2016), and to a lesser extent Taylor (2013).
- Taylor (2013) uses the experience of the USA to argue that explicit rules-based monetary policy tends to outperform other (ad hoc) regimes as measured by the volatility of both output and inflation
- Literature that seeks to evaluate the performance of inflation-targeters has to deal with a number of challenges – primary among these is the choice of a suitable counterfactual. Batini et al. (2005) compare mean performance within each country before and after adoption of inflation-targeting (and assume an average proxy adoption date for all non-adopters). While they show a significant fall in the level and volatility of inflation after adoption, they fail to model the decision to adopt itself.
- Thornton (2016) develops the literature arguing that it is not suitable to compare inflation-targeters with all others. Rather, he compares inflation-targeters with countries under an exchange rate peg of some sort and finds no significant difference in performance (inflation levels and output volatility).
- Further evidence is revealed preference for inflation-targeting. As noted, despite the proclaimed advantages of inflation-targeting, it remains primarily a tool of advanced countries and larger emerging markets. Many lower income countries retain a *de facto* exchange rate anchor (see Rose, 2011), which may be explained by high exchange rate pass through and liability dollarization.

**Question 3: “Describe the different types of macroeconomic Early Warning Systems. What is their practical value for predicting the onset of crises in developing countries?”**

*General comments*

- Note, again, this is a two-part question and each part should be given approximately equal treatment (weight). However, here the first part is mainly descriptive while the second part is more reflective.
- In terms of background to the question, macroeconomic Early Warning Systems connect to literature on how crises can be identified particularly *ex ante*. That is, are there systematic patterns that can be used to warn of an impending crisis?
- It is useful to make a distinction between *ex post* and *ex ante* research on macroeconomic crises. *Ex post* types of analysis typically point out factors or variables that, with hindsight, should have been given more attention prior to crises. *Ex ante* research focuses on variables with strong predictive value.
- A general challenge in this literature refers to the definition of a crisis. Some argue that searching for a stable and all-encompassing definition is a fool’s errand. Rather, where the focus is on *ex ante* prediction, the aim should be to understand / identify periods of excess macroeconomic volatility.

*Types of EWS*

- There are three main types of EWS, as set out in the lecture notes (Topic B3). These are:
  1. Leading indicators
  2. Statistical prediction (regression and classification)
  3. Market-based sentiment (not covered in the course)
- It may be helpful to set out a general model that encompasses the various types of EWS, as found in the literature. This can be given by:

$$Pr(c_{it} = 1 | \mathcal{I}_t) = f(x'_{it}\beta + \varepsilon_{it})$$

$$x'_{it}\beta = \alpha_0 + x'_{it}\alpha_1 + \mathbf{1}[x_{it} - x_T > 0]' (\alpha_2 + (x_{it} - x_T)'\alpha_3)$$

where  $c$  is a binary crisis indicator and  $x$  are a set of explanatory variables observed at or before the period in which the dependent variable is measured. Note that the “leading indicators” approach is a special case of the above where the function is used to classify signals and the other elements are set to zero. Statistical classification (e.g., Manasse and Roubini, 2009) uses a non-linear classification tree approach, which can be understood as a flexible specification that identifies suitable crisis/signalling thresholds automatically (in the other methods they are typically set before the regression/classification procedure).

- Students may elaborate on specific examples of EWS in the literature and explain their implementation in some more detail. Relevant papers are found in the syllabus. At least three generic steps are typically followed to establish an EWS: (a) define what constitutes a crisis; (b) choose a set of potential crisis indicators & associated ‘signalling’ thresholds; and (c) evaluate model performance to identify the ‘best’ or more reliable indicators.



### *Practical value*

- As already noted, a key issue here is to distinguish between *ex post* evaluation / understanding of crisis episodes and *ex ante* prediction of upcoming crises. These are not necessarily the same kinds of models.
- One approach to discussing the practical value of EWS is to consider their limitations *for prediction* (the relevant focus of the discussion here). While different models have different strengths and weaknesses, the following general points may be raised:
  - Definition of a crisis: existing models typically rely on a binary definition of a crisis (exceptions do exist, such as the exchange market or speculative pressure approaches of Frankel and Rose, 1996; and Eichengreen, 1995). Note that these are problematic as they are typically *ad hoc* and rely on proxies (i.e., crisis is a latent variable). Put differently, there are many different types of crises and these appear to change in form over time so the relevance of chosen proxies and thresholds may not be stable. Also, since the challenge of prediction is to identify periods of excessive risks (such that remedial action can be taken) a binary indicator may be too crude or subjective.
  - Logical circularity: a fundamental problem in the literature is that variables used to define a crisis (or period of pressure) are often used as RHS predictors of the same. This induces a general circularity problem – i.e., lags of a variable are found to be good predictors of its future values. From the point of view of prediction, this circularity may not be so much of a problem *per se* (other than we return to the prior challenge of definition). However, it does raise a more fundamental issue that existing models tend to do a poor job of identifying crisis trigger points – i.e., why/when do periods of pressure morph into genuine crises? These are likely to be difficult to predict because they are idiosyncratic, from which we may question the value of ever trying to predict crises.
  - Out of sample performance: linked to the previous points, there is evidence that out-of-sample performance of crisis prediction models tends to be substantially lower than in-sample performance (see Berg, 1999; Manasse and Roubini, 2009). The more general point is that economic structures and risks change over time, so historical correlations may not be a useful guide to future ones. Evidence from the financial crisis of 2007/08 may be used here.
  - Data quality and timeliness: crisis prediction is a real-time challenge, especially so since many crises develop quickly (in months not years). However, many developing countries produce macroeconomic data relatively slowly and with data quality issues. Thus, rely on predictive models that require many (annual) variables into may not be very useful to predict the onset of a crisis.
  - Contagion risk: these are generally the most difficult to spot – while existing EWS models rely on cross-country averages, they nonetheless treat countries as (more-or-less) independent units of analysis. However, many modern crises have shown some degree of contagion (e.g., Indonesia 1997-1999).
- Given the above, students may reflect on alternative directions to pursue, such as focusing less on crises and more on pressure/volatility. One may also note that need for keeping an eye on a dashboard of indicators and the role of market sentiment/expert knowledge for specific countries. That is, EWS are a useful part of the toolkit but not *the* toolkit.