# CBA Working Paper 2023/01

## FPAS Mark II: Better Work-Life Balance Issues

by Vahe Avagyan, Hayk Avetisyan, and Martin Galstyan*

January 31, 2023

# FPAS Mark II: Better Work-Life Balance Issues

by Vahe Avagyan, Hayk Avetisyan, and Martin Galstyan[1]

## ABSTRACT

The introduction of the Forecasting and Policy Analysis System (FPAS) Mark II, which introduces the idea of "monetary policy as risk management" to better deal with uncertainty and nonlinearities, provides an unparalleled opportunity to rethink the role of human capital in central banks. Rather than treating human capital as an afterthought, FPAS Mark II emphasizes the important role of well-trained, collaborative, and balanced team members in making good policy. We explore practical and realistic solutions to the myriad human capital challenges facing central banks, including proposals for: a flexible organizational structure; the development of a dynamic learning environment; and a condensed policymaking round that eliminates major inefficiencies. The ultimate result of such solutions is to dramatically increase the productivity, efficiency, work-life balance, and wellbeing of staff.

## ACKNOWLEDGMENTS

---

[1] Additional authors include M. Gevorgyan, E. Hovhannisyan, H. Igityan, J. Gilbert, H. Karapetyan, Kostanyan A., D. Laxton, J. Laxton, A. Matinyan, A. Nurbekyan, A. Papikyan, and N. Yeritsyan.

# TABLE OF CONTENTS

# I. INTRODUCTION

The experience of central banks in the period since the beginning of the Covid-19 pandemic has laid bare the limitations of existing monetary policymaking frameworks to deal with uncertainty and nonlinearities. When uncertainty emerges in the form of significant differences between central banks' baseline forecasts and what actually occurs in reality, it becomes extremely challenging for policymakers to change course and adjust policy instruments sufficiently aggressively in response to this new reality.[2] Even if it may be the correct policy decision at that moment, changing course would mean admitting that the policymakers were wrong. As a result, both policy effectiveness, as well as the credibility and legitimacy of the central bank, are at stake every time a baseline forecast is published. This idea was clearly evident in practice during the Summer of 2021, when economists such as Lawrence Summers were sounding the alarm that inflation was persistent rather than temporary, as the Fed had been arguing in both its communications and policy decisions.

Archer and others (2022)[3] explore this "folly in baselines and local approximations," and instead propose an alternate approach, which institutionalizes Alan Greenspan's 2004 formulation of "monetary policy as risk management" into a systematic policymaking framework. This framework, known as the Forecasting and Policy Analysis System (FPAS) Mark II, represents a modern evolution of the existing FPAS to better deal with uncertainty and nonlinearities. By eliminating the baseline-scenario approach to forecasting, the central bank is able to shift away from its role as expert forecaster, where its accuracy and credibility will inevitably and unnecessarily be at stake. Instead, the central bank can focus its efforts on scenario analysis, where different plausible futures and (nonlinear) policy paths are evaluated for the harm that might result.

With the introduction of best-in-class approaches to monetary policy decision-making in FPAS Mark II, a unique opportunity emerges to rethink not only how monetary policymaking is conducted and communicated, but also, what role human capital ought to play in this revitalized system. In developing teams that are responsible for carrying out world-class monetary policy modeling, research, and decision-making support under the Forecasting and Policy Analysis System (FPAS) Mark II, the primary challenge lies in developing organizational structures that support, rather than hinder, economists' productivity, collaboration, and development. The typical institutional and bureaucratic barriers inherent to many central banks and MPD's can have dangerous consequences, and often, they do more to circumscribe individuals' growth than to support efficiency or productivity. The introduction of FPAS Mark II provides the chance to fundamentally rethink how monetary policy departments are organized; how staff are trained; how teams are structured; what type of culture is created; what values are cultivated and rewarded, and what toxic traits are not tolerated; and what degree of work-life balance is encouraged. In addition, it is worth mentioning that the development of ideas in this paper are inspired by large evidence about some of the issues faced by FPAS Mark I CBs with respect to the productivity of individual experts and the creation of collaborative environments for teamwork.

The central focus of this paper is exploring the role of human capital under FPAS Mark II. In this best-in-class decision-making framework, the development of human capital must be a fundamental priority of the central bank, rather than a mere afterthought. This paper seeks to demonstrate that there are, in fact, practical and real ways to prioritize and support the near- and

---

[2] See Alsterlind (2017) for a demonstration of how forecasts by even the most well-seasoned flexible-inflation-targeting central banks (New Zealand, Czech Republic, Norway, and Sweden) are consistently inaccurate.

[3] Refer to Archer and others (2022) for a detailed presentation of FPAS Mark II.

long-term growth and wellbeing of staff in monetary policy departments (MPD's). Developing institutions and policymaking frameworks where human capital is truly at the forefront is admittedly not an easy task. However, the opportunity costs of not doing so—of continuing to neglect human capital and retaining outmoded hierarchies and bureaucracies—are far greater in the long-term than the resources and effort required to make this change. The benefits of a human-capital-first organizational approach make this clear: high and rapidly-growing productivity; efficient processes and resource-allocation that minimize bureaucratic hierarchies; a collegiate culture of collaboration that incentivizes staff to learn and grow; greater dynamism and flexibility in how teams are staffed and how staff allocate their time; among others. Perhaps most importantly, all of this seeks to minimize the stress and inefficiencies that lead to burnout and hurt work-life balance—perhaps the greatest human capital challenge for MPD's.

The paper puts forth some of the key principles of a working HR model to support the development of FPAS Mark II, as follows:

1. Development of universal macro-analysts at the core of production staff. This is intended to support the following:
   a. Allow better institutional continuity and codified knowledge, when the processes are not dependent on specific sectoral experts.
   b. Enable development of better candidates for the job market, with broader skillset for a typical macro policy analyst with global outreach.
   c. Easy and effective rotation mechanism from round to round without sacrificing the quality of the processes and effectively utilizing the effort and energy of the staff members.
2. Enhance collaboration and teamwork in a dynamic learning environment. Every person in the team has an opportunity to be part of the main projection rounds at different roles, and at the same time there remains enough time for meaningful personal development in a very collaborative environment of professional colleagues, experienced international advisors, and rising stars.
3. Better work-life balance is achieved in the organizational and functional design of the framework.

This paper is the first in a series of four papers, to be issued quarterly in 2023 by the Central Bank of Armenia, identifying practical and feasible solutions to the myriad human capital challenges confronted by MPD's at virtually every central bank, with the goal of dramatically improving productivity, collaboration, and work-life balance. This first paper focuses on organizational questions related to how teams are structured, how a dynamic learning environment can be created, and how this structure might play out during policymaking rounds. The remaining papers will continue to elaborate on these ideas as well as address other themes related to human capital, including recruitment, retention, incentive structures, inter-departmental collaboration, and so on.[4]

This paper begins with a detailed description of the organizational structure of an FPAS Mark II MPD, including both roles/responsibilities as well as how staff are tested and qualified. Section III introduces arguably the most important cornerstone of FPAS Mark II human capital: the Dynamic Learning Environment (DLE), an intensive, rigorous, and highly collaborative environment that seeks to develop the world's best thinkers and macroeconomists. Section IV provides a practical illustration of how such a team structure, operating within a DLE, could operate during

---

[4] Refer to the forthcoming Avagyan and others (2023x y z).

policymaking rounds, underscoring the improvements to efficiency and work-life balance that such an approach provides. Section V offers concluding remarks.

# II. ORGANIZATIONAL STRUCTURE

## A. The Problem of Excessive Hierarchy and Rigidity

All teams and institutions require organizational structure. Whether that structure be positive—supporting staff to carry out their work more efficiently and productively, and incentivizing them to consistently grow and develop—or whether it be negative—creating inefficient bureaucracy and unnecessary hierarchies that stifle long-term growth, creativity, and learning—is not predetermined. Unfortunately, the vast majority of MPD's in central banks around the world (and, indeed, virtually all sufficiently large pubic- and private-sector organizations), adopt the latter approach.

These inefficient and hierarchical organizational structures can be extremely problematic, for several reasons. First, excessive hierarchy and rigid divisions between teams run the risk of cordoning people into silos, where individuals become extremely specialized in narrow tasks but have little knowledge of anything else. In this context, individuals only have incentives to grow in one narrow arena, but even then, they may hit growth ceilings, and could instead adopt a "good enough" approach to getting tasks done. The end result is a MPD with groups of "task doers" rather than well-rounded economists who think critically. Worse still, when such specialized "task doers" leave the central bank, their roles become difficult and costly to replace. Second, such rigidity discourages collaboration and knowledge-sharing across teams. Not only are there few incentives for this type of collaboration, but even when it does take place, it often occurs in excessively formal ways (e.g. a division head reaches out to another and asks for support or knowledge-sharing from the latter's team, who then determines if his or her staff has enough time to devote to helping another team, with the answer often being "no"). Such an approach hardly qualifies as learning, which needs to occur organically and dynamically to have maximum effect. Third, such rigidities present challenges for efficient resource allocation that maximizes each individual's potential contribution. As team members enter into specialized silos, they may become highly adept at fulfilling that specific role, but this may be different from their actual interests, or may significantly underutilize their potential. For example, an individual responsible for calculating core inflation in an MPD may be a highly adept macroeconomist capable of wearing many hats, but rigid divisions between roles and teams prevent these skills from ever being discovered or utilized by the central bank. The end result is that individuals, teams, and the central bank at large suffer from low morale, inefficiency, and low productivity.

## B. Organizational Structure of FPAS Mark II Monetary Policy Department

Given the aforementioned challenges that excessive hierarchies present to MPD's, the FPAS Mark II proposes an alternative approach to structuring the team and department. This approach seeks to diminish unnecessary hierarchies, rigid divisions between teams, and silos, instead proposing a relatively flat, flexible, and dynamic organizational structure that is better equipped to support, rather than hinder, team members' growth, learning, and development into world-class macroeconomists. Below we describe the organizational structure that is designed to ensure effective management of human resources and share the administrative burden among the management. For this reason, the staff is organized under group managers to whom they report to with respect to HR and development issues, and on administrative matters. We clearly distinguish this HR-related management structure from functional or process-related division that occurs during projection rounds, which is instead kept flat and flexible, as described in Section IV.

**Figure 1. Organizational Structure of an FPAS Mark II Monetary Policy Department**
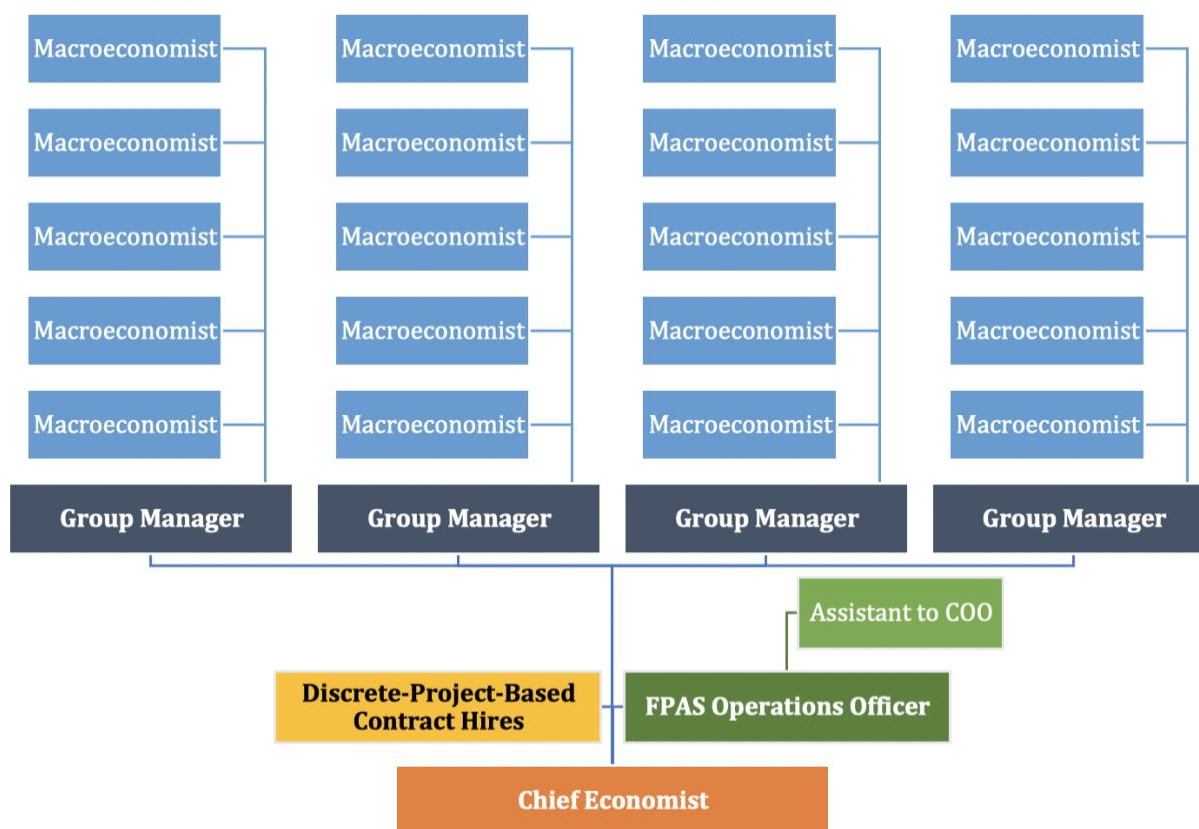


Source: Authors' concept

## B.1. Chief Economist

The Chief Economist serves as the head of the Monetary Policy Department (MPD), and would be responsible for ensuring that all of the central bank's resources are used efficiently to support FPAS Mark II. The Chief Economist leads all the projects and processes in the department, on rotational basis coordinates and leads one of the quarterly projections rounds, serves as an important liaison between the Board and the staff, gives direction to the COO and team managers, and so on. In this role, the Chief Economist would need to possess both an unquestionable level of macroeconomic skills and knowledge—serving as the key thought leader for monetary policy at the central bank—but also, and perhaps equally importantly, a natural aptitude for managing, leading, and inspiring his or her staff.

## B.2. FPAS Operations Officer

The FPAS Operations Officer would be a skilled macroeconomist who is also responsible for managing the operational elements of the MPD. This would include: managing the team's assets (models, documentation, data, etc.); overseeing organizational aspects of human capital (resource allocation, testing, feedback, etc.); developing platforms for macroeconomists to gain and share knowledge (e.g. brown bag lunches, seminars, workshops, and conferences); coordinating the

efforts of the MPD with other departments within the central bank (including both administrative-oriented staff such as information technology, cybersecurity, human resources, as well as production-oriented teams including statistics, research, financial stability, and so on). In many ways, the FOO would be the best of the group managers, described below. The FOO would be supported by an assistant to help carry out these tasks, and/or by an HR Manager, as described below.

In central banks where existing staff resources in the conventional human resources (HR) department are particularly robust and forward-thinking, a dedicated GFS HR Manager from the HR team can support the FPAS Operations Officer in executing the administrative tasks. This HR Manager would need to be relatively well-versed in the processes of monetary policymaking, FPAS Mark II, the DLE, and fully buy in to the principles and rigorous standards of FPAS Mark II, as described throughout this paper. However, the HR Manager would not necessarily need to be a qualified macroeconomist. Such an approach would only be feasible in central banks where existing HR teams have highly qualified staff who organically align with the DLE's commitment to excellence (see subsection III.A), and who have an innate aversion to excessive and unnecessary bureaucratic hierarchies.

This would allow the FPAS Operations Officer to allocate less of their time to time-consuming administrative tasks, and instead focus on a more leadership and human capital management role. With this greater operational freedom, the FPAS Operations Officer could support the Chief Economist as a key leader within the MPD who is focused on strategic issues related to human capital development and team members' growth, and who can liaise with broader central bank leadership on key administrative and management questions.

## B.3. Group Managers (Different from Projection Round Team Leads)

Group managers would be advanced macroeconomists, possessing expert mastery of the core competencies outlined in subsection C.1. and being towards the upper end of the GFS levels (see subsection C.3). More important than their technical skills, however, is their ability to manage people from the perspective of human capital and development. We understand the term manager in its truest sense—as someone who leads people, guides their development, and pushes them to become better—rather than as signifying someone who is their "boss" on a given project, or who is the most skilled modeler or scenario-builder. In addition to serving as traditional macroeconomists responsible for executing and producing work (see subsection B.4 below), the managerial component of the group managers' time would be spent on the following key areas:

1. *Training, Coaching and Collaboration*: Managers as part of the FPAS process coach the staff. They also collaborate or backup staff producing FPAS Mark II products. <u>80 percent</u>
2. *Help manage resources* to maximize the effectiveness of all the FPAS teams. <u>10 percent</u>
3. *Provide ongoing feedback and complete APRs*. Understand relevant HR rules and ensure job responsibilities are updated. <u>10 percent</u>

Managers would need to be highly inspirational, people-oriented, and agreeable, taking the time to cultivate one-on-one relationships with their staff and creating a culture of teamwork and collegiality every day. Understandably, managing, leading and inspiring people and the teams are among the soft skills that are developed over time within the DLE, likely at the upper end of the GFS levels. Importantly, this role is not that of a traditional boss or superior, in the sense that this role is intended to facilitate growth and development among the team and create a team culture, rather than representing necessarily the best performers or smartest economists.

## B.4. Macroeconomists

Macroeconomists form the core foundation of the team. They are the most essential members of the team, responsible for building and running models, drafting monetary policy reports, conducting cutting-edge research and analysis in hot topics in macroeconomics, and so on. As a result, macroeconomists who are part of the FPAS Mark II must be on track to becoming the best in the world, and should meet all of the core competencies outlined in subsection C.1.

Underlying each of these core competencies is the most important trait that an FPAS Mark II macroeconomist must possess: the ability to think critically. Rather than deferring to the analytical tools (e.g. "the model says…therefore, it must be that…") or to the literature (e.g. "I read ten papers from name-brand economists that argue this point, so it must be true…"), an FPAS Mark II critical thinking macroeconomist would have no choice but to develop and defend their own opinions via critical reasoning and empirical analysis.

## B.5. Discrete-Project-Based Contract Hires

We recognize that not all highly-skilled macroeconomists/modelers/statisticians would be willing or able to make the commitment to join the Macroeconomist career path at the MPD, which requires an explicit commitment to being a team player and developing extraordinary internal and external communication skills. However, we recognize the importance of finding an avenue to utilize the resources of these types of individuals to the benefit of the MPD team and its output.

A practical and efficient solution would be for these individuals—who could include, for example, professional researchers, statisticians, modelers, programmers—to be brought into the team for discrete projects on a contractual basis for a fixed period of time. This would be particularly useful at times when highly specialized skills are needed that the team does not possess (whether due to a shortage in resources or time), and would allow the MPD team to leverage their specific strengths without sacrificing the critical elements of DLE and culture that are critical for FPAS Mark II MPDs. Another very important contribution from such specialists would also be training and research collaboration provided by them to the whole team involved in the FPAS processes.

# C. Macroeconomist Qualifications and Testing

## C.1. Minimum Level of Fundamental FPAS Mark II Knowledge and Skills

In order to join the team as a FPAS Mark II macroeconomist, team members must be able to expertly execute work in the following four areas:

- **Current Analysis**: Conduct deep, comprehensive, and data-driven analysis of different sectors of the economy (real, external, financial, fiscal, etc.) in relation to their historical developments, current situation, and short-term developments; highlight and describe trending and temporary factors of current developments.
- **Scenario-Building and Policy Analysis**: Construct medium-term macroeconomic scenarios under the "New Keynesian" paradigm and perform coherent policy analysis. Describe risk profiles around scenarios.

- **Communication**: Prepare and contribute to the production of high-quality policy and communication documents to a wide variety of audiences, such as policy notes, presentations, monetary policy reports, and other communication documents.
- **Modern Macroeconomics**: Have a profound knowledge in modern macroeconomic (and microeconomic?) theory. Carry out theoretical and empirical research on specific topics of interest for monetary policy.

As an important foundation for being able to execute work in the above arenas, team members would be expected to maintain bilingual fluency (in both the nation's native tongue and English), possess an excellent command of advanced mathematics (as a foundation for carrying out empirical analysis), and have at least working knowledge of coding languages (e.g. R/Python, Matlab/Julia, etc.).

## C.2. Testing & Qualification Process

The process by which team members' skills and aptitude in the above areas is tested and qualified must be rigorous, transparent, and equitable. In order to establish a level playing field that gives all team members the opportunity to develop these competencies, a formal training and learning system should be established by the central bank. The Central Bank of Armenia, for example, has established the Global Forecasting School (GFS), which is modeled as a world-class economics institute. The GFS is intended to provide a combination of theoretical and practical approaches to help emerging economists learn how to think critically about macroeconomics; understand and develop world-class, nonlinear analytical frameworks; and study the policy implications of nonlinearities and uncertainty. Importantly, the MPD should be strict in allocating at least one hour per day for team members to participating in GFS courses and/or testing.

Team members who proceed through the GFS training courses would concurrently be tested for their progress on the core competencies. The testing process would be highly dynamic, evaluating economists for both their ability to develop knowledge and put skills into practice, and more importantly, their ability to communicate these ideas clearly and coherently across a variety of mediums. Tests would take on the form of ten writing assignments (in the form of a policy memo to the central bank governor), ten presentations (to a professional, expert audience), and ten video recordings (in the form of a well-seasoned teacher's lecture). Structuring the tests in this way would force team members to develop their oral and written communication skills, which are especially important in FPAS Mark II, where communications and transparency are fundamental to the central bank's ability to make good policy and maintain credibility.

In order to reach the next GFS level, team members need to complete the total thirty tests (ten interviews, ten essays, and ten presentations) within one year. From a practical perspective, team members would need to receive two to three passing grades on average per month to be on track to successfully reach the next GFS level within the one-year deadline.

An important component supporting team members' successful completion of the testing process is the buddy system, as described in subsection III.B.2. Buddies would support one another in filling in key knowledge/skill gaps. For example, a team member who is a poor verbal communicator but an excellent economic theorist could be paired with someone possessing the opposite skills. This would allow team members to dynamically train one another and transfer skills and knowledge throughout the process.

An example of a workable model of the GFS testing and qualification process and its accompanying rules and processes, as implemented at the Central Bank of Armenia, is presented in Appendix B.

## C.3. Professional Qualification Levels (at the GFS)

Each team member within the FPAS Mark II MPD would be expected to progress through the six qualification levels of the Global Forecasting School. These qualification levels reflect the level of skills, knowledge, and expertise each team member possesses, which would be assessed via the process described in subsection C.2. Team members would need to pass to the next level via this testing process each year, and those who fail to move up a level within one year would not be considered sufficiently competitive or qualified to be part of the team, and would need to seek out new opportunities (up or out). Moreover, this approach would mean that no team member could stay in the MPD for longer than six years. This ensures that the pool of talent within the MPD always remains fresh, that new ideas and approaches are always circulating, and that people are not allowed to stagnate. This also has downstream effects for the country's broader economy as well, as these extremely well-trained, critical thinking macroeconomists would then be employed by private and public sector organizations around the country (and beyond) (or in other areas at the Central Bank). This would serve to have large multiplier effects, as not only would these team members bring with them a culture of extremely high productivity and efficiency, but also, would expect to create a culture of collaboration and dynamic learning wherever they go.

The six Professional (GFS) qualification levels are as follows:

- **Level I.** Prepare scenarios, create polished presentations and policy notes. Prepare polished drafts of a summary section of an FPAS Mark II Monetary Policy Report (MPR). Start coaching pre-GFS students.
- **Level II.** Require much less Tender Loving Care (TLC) preparing scenarios, presentations, notes and draft MPRs. Can work more independently and help other GFS students assigned to them. Mentor and teach level 1 students basic FPAS Mark II Training. Deeper knowledge of background material covered by FPAS Mark II basic training compared to lower-level GFS students
- **Level III.** Produce polished policy notes, discussion papers, presentations and draft MPRs up to the highest available standards (setting new standards). GFS Trainer that is responsible for running and organizing the school. Should be able to mentor and teach lower-level students basic FPAS Mark II Training. Deeper knowledge of background material covered by FPAS Mark II basic training compared to lower-level GFS students
- **Level IV.** Invests significant time in coaching and capacity development of the next GFS generation. Visionary approach to develop the whole system by pushing it beyond the existing status quo. Proven track record of applied knowledge in concepts required for lower levels. Responsible for managing GFS (system design, resource management and sustainability). Deeper knowledge of background material covered by FPAS Mark II basic training compared to lower-level GFS students
- **Level V.** Seasoned in both technical and managerial aspects of the previous levels. Deep knowledge and expertise in all functional components of FPAS Mark II to a level that he/she is able to lead an establishment of a fully functional FPAS Mark II framework within a given institution. Responsible to oversee GFS standards and implementation issues, develop new features and push the whole system beyond status quo. Deeper knowledge of background material covered by FPAS Mark II basic training compared to lower-level GFS students

- **Level VI.** World-class expertise in monetary economics, renowned within policy/academic worlds. Should be able to fully design and setup end to end implementation of FPAS Mark II or similar frameworks in practically every institution. Executive managing the GFS program including standards, program design and implementation issues. Deeper knowledge of background material covered by FPAS Mark II basic training compared to lower-level GFS students

## III. DYNAMIC LEARNING ENVIRONMENT
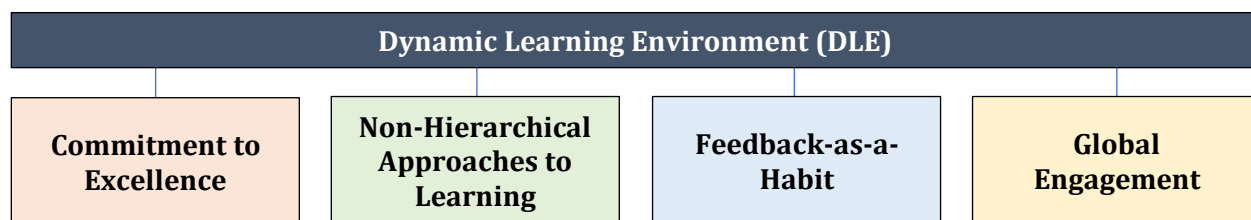
A hallmark of FPAS Mark II is creating a Dynamic Learning Environment (DLE) within monetary policy departments and beyond. DLE is defined as an intensive, rigorous, and highly collaborative environment that seeks to develop the world's best thinkers and macroeconomists. We shift away from overly hierarchical and bureaucratic models and towards a collaborative system where economists immerse themselves in thinking critically, learning at lightning speeds, sharing knowledge, and giving and receiving constructive feedback as a habit. We're creating critical thinkers—not just doers. As a result, the skills, standards, and productivity of staff—and the policymakers who rely on them—can increase immensely.

The DLE is built on the following key pillars:

### Figure 2. Pillars of a Dynamic Learning Environment

| Dynamic Learning Environment (DLE) | | | |
|---|---|---|---|
| Commitment to Excellence | Non-Hierarchical Approaches to Learning | Feedback-as-a-Habit | Global Engagement |

Source: Authors' concept

## A. Commitment to Excellence

Creating a dynamic learning environment requires members of the team to make a commitment to excellence. In other words, team members would need to have a strong innate desire to become and be among the best macroeconomists in the world, and be willing to put in the resources and effort necessary to do so. As such, team members would need to possess the following "soft" characteristics that are defining features of superstars, not only in macroeconomics, but in virtually every field, from the business world to athletics:

### Figure 3. Characteristics of Superstar Macroeconomists

Innate drive and motivation

Internal locus of control: ask "what can I do better?" not "why am I so unlucky?"

High sense of personal responsibility and accountability, with little tolerance for excuses

Team player who invests in those around them

Willingness to make mistakes and fail

Source: Authors' concept

These characteristics represent essential features of all team members who join the FPAS Mark II MPD, and are the foundation that allows them to truly benefit from the features of a Dynamic Learning Environment to grow and develop at lightning speeds. These characteristics are non-negotiable. If individuals who lack these essential characteristics are allowed to be part of the team, not only would they be unable to achieve the high degrees of productivity and quick learning required in a DLE, but also, and perhaps far worse, would diminish the overall culture of collegiality, enthusiasm, and continuous development. This undesirable culture would infiltrate into the rest of the team, with the potential to inhibit the growth and attitudes of even the best performers.

## B. Non-Hierarchical Approaches to Learning

In order to develop world-class teams of superstar macroeconomists quickly and efficiently, it is necessary to eschew overly-rigid hierarchical models of learning, where strict student-teacher or boss-employee dynamics dominate. Rather, we emphasize the importance of non-hierarchical approaches to learning that leverage the individual strengths of team members to *both learn and teach*. Through this approach, knowledge and skills can be shared organically, dynamically, and informally. To facilitate this process, the following two organizational elements are recommended:

### B.1. Training, Coaching, and Collaboration Program (TCCP)

**Training**: Staff are provided with training material and services on specific topics that are interesting to the staff and relevant for the MPD. Training can be both formal- and informal-style lectures. Staff should also be given courses ranging from introductory to advanced levels concerning monetary policy and central bank activities, depending on the level of staff.

**Coaching**: In addition to a formal buddy system (see the next subsection), staff should be continuously coached by more senior staff, managers, board members, and leadership. This would include both project-based, task-specific coaching as well as on-the-fly coaching that arises informally.

**Collaboration**: As individual staff members and teams are trained and coached on specific topics, there must be a culture of continuous knowledge-sharing and teaching among peers. Amidst this culture, the process of generating work output—in the form of the projection round, research papers, presentations, and so on—would become significantly more productive and seamless, as all of the necessary skills, knowledge, and ingredients for successful output among the team would be in place.

### B.2. The Buddy System

To facilitate the process of coaching and knowledge-sharing in a way that is formally defined while also being an organic and natural process, a buddy system should be implemented. More junior members of the team should be paired with more experienced staff, who could serve as a readily-available resource for learning new skills, answering key questions, and developing best practices. At the same time, we emphasize that the buddy would not simply share technical expertise, but also, and more importantly, would provide career guidance and impart wisdom on how to manage difficult situations, progress in their career, cultivate relationships, and so on. Staff would be paired with one another depending on their interests, skill levels, and so on, but there could also be

opportunities to pair staff across teams in order to encourage even greater collaboration. Moreover, senior leadership from outside the MPD could also participate in the buddy system, coaching the most experienced staff on how to develop the leadership and management skills needed to lead departments and even the bank at large.

With these and other structures in place, the hierarchical modes of learning in place today (Figure 4, Panel A) could transition to the more dynamic system shown in Panel B.

### Figure 4. Systems of Knowledge-Sharing & Learning

**Panel A. Traditional Hierarchical Learning**  **Panel B. Dynamic Learning**
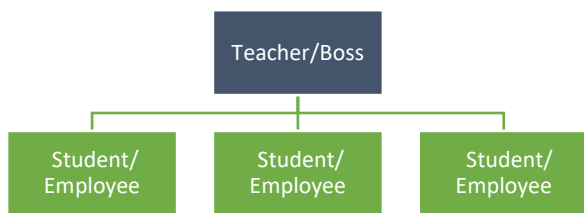


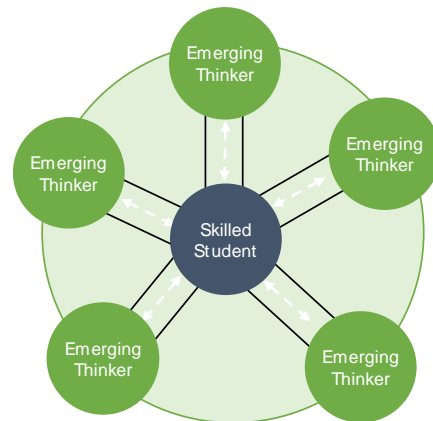Source: Authors' concept, inspired by Jacqueline Karaaslanian of Learning Learning Architects

## C. Feedback-as-a-Habit

An important element of the Dynamic Learning Environment is creating a culture of constant feedback that is given and received by habit. In most institutions, the process by which feedback is given is highly artificial and forced, occurring only once or twice a year during performance reviews. As a result, the feedback that is given tends to be superficial at best, failing to reflect the true scope of a team member's contributions, growth areas, and so on. This type of feedback serves little value other than checking a box—it does not give the team member tangible insight into what they are doing well and where they need to improve. Moreover, for feedback to serve as a helpful tool, it needs to be provided regularly and in real-time, rather than several months apart. In this context, it is not difficult to understand why employees in most institutions tend to view the notion of feedback with skepticism or aversion.

The Dynamic Learning Environment seeks to change this understanding of feedback-sharing as a rigid and artificial process. Instead, it calls for creating a *culture* of dynamic feedback-sharing, where asking for and giving feedback—both constructive and positive—is a regular aspect of day-to-day work. To facilitate the emergence of this process, we suggest to initiate "Feedback Fridays," where team members give and receive feedback on the week's performance. This would not be a supervision or performance assessment system, but rather, a way for employees to understand in real-time how their performance has been, receive positive reinforcement, and most importantly, understand what their most pressing areas of growth are. Through this approach, team members

would have the incentives to prioritize their personal growth and development at all times, and not delegate this important question to the "back burner," where it is only thought about during annual performance reviews. In Appendix A, we present an example of what this prioritization of feedback would look like in practice. Team members would be expected to prepare one-pagers based on their feedback, which would both highlight their key strengths and emphasize the areas in which they need to grow and develop further. Rather than shying away from the constructive feedback they receive or attempting to gloss over their shortcomings, team members would be expected to emphasize their weaknesses and growth areas and communicate this with the rest of the team, serving as a further tool for development and accountability. This would also assist in creating a culture of feedback-sharing, with the hope and expectation being that team members would, over time, organically solicit and provide feedback in informal settings as well, such as during/after working sessions, rendering the existence of formal "Fridays" unnecessary. The key value needed for this feedback culture to take hold is respect towards the ideas and contributions from teammates and colleagues. At the same time, respect plays a significant role in creating an open feedback-sharing environment, where each member of the team takes responsibility to support the growth of mates through constructive and positive feedback, while remaining open and respectful to others' comments and feedback.

## D. Global Engagement

Good monetary policymakers and macroeconomists, of course, maintain global perspectives and always seek to engage with the best and freshest thinkers, ideas, and experience around the world. For senior leadership at central banks, maintaining such a global mindset is a part of the job, and is relatively easy to accomplish given their network, the events they are expected to participate in, constant traveling, and so on. For more junior staff, however, engaging with global thought leaders can often be a challenge, and as a result, staff run the risk of developing insular perspectives and ideas about work—both from a technical and administrative point of view—that damage their near- and long-term growth prospects.

For this reason, the DLE emphasizes the need to create environments where junior staff are constantly engaging with thought leaders from around the world, from leading macroeconomic thinkers and policymakers to more junior colleagues in peer institutions in other countries. To facilitate this, the DLE includes weekly seminars that bring these people together on a regular basis, and give junior staff the opportunity to not only hear from other countries' and people's expertise and experience, but also, to share their own work and ideas on topics of global—and not just local—concern. Moreover, the working environment within the FPAS Mark II MPD would be expected to include experienced international advisers, professional domestic and international macroeconomists, interns/exchange students from abroad, and so on, all of which would inject the team with fresh global perspectives and avoid an insular approach. Lastly, the quarterly Central Bank Macroeconomic Modeling Workshops would serve as another tool for macroeconomists to interact with, learn from, and challenge leading minds in the profession.

# IV. QUARTERLY PROJECTION ROUND

The FPAS Mark II quarterly policymaking process, as outlined in Archer and others (2022), comprises a 28-day cycle, as summarized in Figure 5. We present below a brief overview of the cycle leading up to the Issues Meeting, and focus the reader's attention on the projection round, where the staff would be most intensely involved, in order to describe how human capital and organizational questions would be addressed within this context. We refer the reader to Archer and others (2022) for further detail on the specifics of the policymaking round.

## A. FPAS Mark II Policymaking Process

- **Kick-Off Meeting**: To begin the policymaking round, the Board meets in a general meeting intended to spur robust discussion about the major tail risks and uncertainties that represent particular causes of concern.
- **Develop Essential Ingredients in One-Pagers**: Following the kick-off meeting, the Board members, working with Level 2 GFS Coordinators (refer to subsections B and C), each outline the *essential ingredients* that would be used to build Case A and Case B scenarios, according to their own thought processes. Coordinators would assist the Board members in developing succinct one-page narratives outlining the high-level ingredients and assumptions related to what they would include in their preferred Case A and Case B scenarios, which would be submitted to the Chief Economist/Projection Coordinator three days before the Issues Meeting.
- **Issues Meeting**: Two weeks before the decision day, an Issues Meeting is held between the Board and the Projection Coordinator. After having the big picture of Board concerns, under the authority of the Governor, the Projection Coordinator formulates illustrative Case A and Case B scenarios, which would be ultimately used for communication purposes. Some of the ingredients that the Board Members presented would be used as input to construct the two Case A and Case B scenarios.
- **Projection Round**: The Projection Coordinator leads daily quarterly projection meetings with the staff. Through a collaborative and iterative process, the Projection Coordinator and the some of the MPD staff systematically and clearly builds out the Case A and Case B scenarios, quantifying the scenarios through core quarterly production models and satellite models, where feasible. Particular attention would be paid to their policy implications (in terms of the forward paths for instruments needed to achieve convergence on objectives) as well as their welfare metrics. Board members' Level 2 GFS Coordinators can participate on a voluntary basis in these meetings, to monitor the process and understand what ingredients are being included or excluded.
- **Submission of Final Case A & B Scenarios**: The Projection Coordinator submits final Case A and Case B scenarios to the Board three days in advance of the Policy Decision. Once these scenarios have been submitted as final, they would not be subject to any further changes.
- **Policy Decision**: Against the backdrop of the prior 27 days' lively discussions and debates of the ingredients, along with the submission of the final Case A and Case B scenarios, Board members would be able to propose their policy decision. As part of the decision-making process, board members would make submissions that include: the policy action they propose; how that action connects to what they believe may happen in the future and its ensuing policy implications; and their commitment to changing course if new information arises. The Board's decision would be announced in tandem with issuance of the Monetary Policy Report, which would clearly communicate through a *narrative approach* the Board's

decision with reference to the scenarios and ingredients considered by policymakers to be most relevant to the current situation and its uncertainties.

**Figure 5. FPAS Mark II Policymaking Cycle**
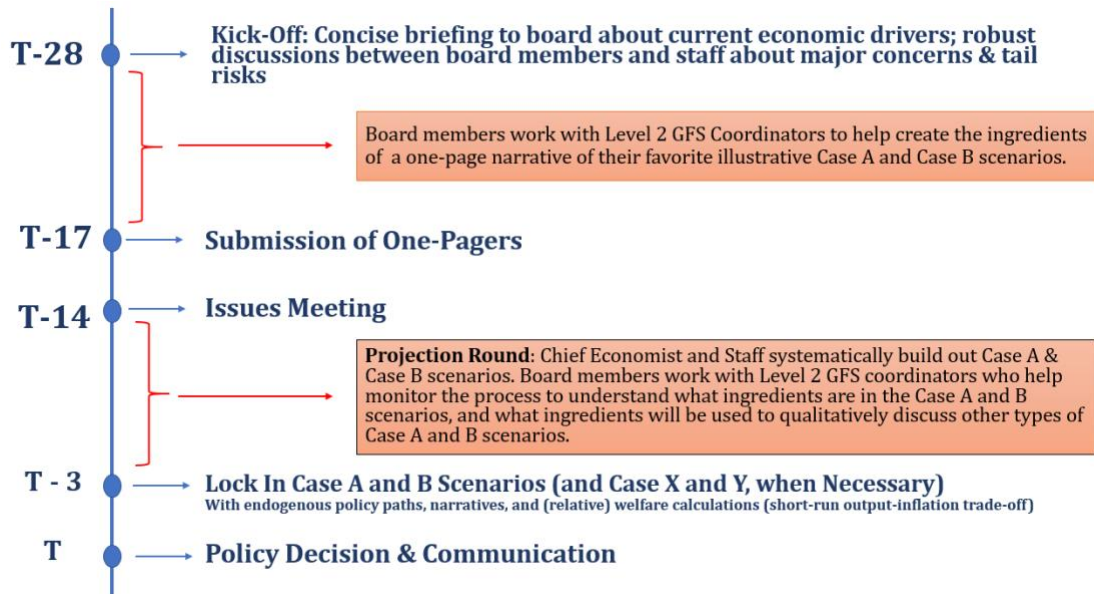


Source: Archer and others (2022)

## B. Team Organization during Projection Round

An important element of the organization of staff during the projection round is the team-based structure, as outlined in Figure 1. During each projection round, two of the four MPD teams (each comprising six macroeconomists) would be actively involved in the process. One of the teams would be engaged in "heavy lifting" and actually building out the scenarios, while the second team would play a support role, providing key tactical and technical support to the projection team and guiding them throughout the process. During each round, each team would be led by a Projection Round Team Lead, on a rotational basis, who serves as the thought leader for the team in that round and is responsible for guiding the rest of the team through the day-to-day of the projection round. Notably, this role differs from the Group Managers described in subsection B.3, the latter of whom serve a human capital/resource management role, and would not necessarily also be the Projection Round Team Lead. As thought leader during the projection round, the Projection Round Team Lead would serve as a de-facto deputy to the Chief Economist during the round, stepping up to support the Chief Economist in managing both the policymaking round as well as political/organizational considerations.

The six-person MPD team that is leading the projection round could allocate resources and responsibilities in the following way. Four macroeconomists would be assigned to work on the case scenarios (Case A, Case B, and where necessary, Case X/Y), and would take full ownership of the scenario-building process. These four macroeconomists would also be responsible for drafting the sections of the Monetary Policy Report (MPR) that pertain to their case scenarios, as well as assisting the Projection Coordinator/Chief Economist in fleshing out the Board presentation and

the remaining portions of the MPR in the days leading up to decision day, such that the MPR can be published almost concurrently with the Board's decision. The remaining two team members would serve as Coordinators for the Board Members, as described in the following subsection C.

The remaining two MPD teams would be less heavily involved in the process, providing tactical support where necessary but primarily dedicating their time to "preparing for the future." This would include continuing to work on trailblazing, policy-relevant research output; developing and refining the analytical toolkit; conducting current analysis on specific issues; and so on. At the same time, with this they might generate special analysis (e.g. boxes) that could appear in the MPR of the current projection round.

Through this approach, only up to two MPD teams would be heavily invested in each projection round from the perspective of time and resources. This would allow a meaningful reduction in stress and fatigue for the remaining members of the team, and allow for greater "burden-sharing" among MPD team members throughout the year. As a result, each team would only take on the challenge of leading the projection round once per year, for nine days (plus the time for drafting the MPR)—a meaningful reduction in time commitment relative to current approaches adopted by inflation-targeting central banks, where the MPD team is heavily invested in projection rounds for nearly two months, four times a year. Thus, rather than spending eight months of the year in a high-stress, high-time-burden environment, MPD staff would instead spend nine days of the year leading the projection round, nine days overseeing the lead projection team, and could spend the remaining eighteen days of the policy cycles carrying out trailblazing research and other relevant tasks. This approach represents a meaningful positive change to the work-life balance structure of the MPD, where team members do not have to make heroic sacrifices—in terms of personal life, time dedicated to raising children or caring for families, or sanity—in order to work as central bankers.

It is important to mention that the possibility of dedicating only one team of five people "to conduct the whole round" without any material sacrifice in quality is possible only in a collaborative environment of professional universal macro-analysts.

## C. Role of Board Coordinators in Lead-Up to Projection Round

Beginning in the kick-off meeting, and leading up to the Projection Round, two members of the MPD, selected from the team that is leading the projection round (see subsection B above), would be designated as Coordinators for the Board members. These Coordinators would represent, at a minimum, Level 2 GFS knowledge and skills, and would be highly adept macroeconomists who excel in economics, have strong modeling skills, are star communicators, and can manage resources and time highly efficiently.

Following the kick-off meeting, the two coordinators would work closely with the Board members to translate their thoughts, ideas, and concerns—first articulated during the Kick-Off Meeting, but further fleshed out during subsequent formal and informal meetings, brainstorming sessions, and discussions—into one-page submissions. These one-pagers would take a narrative approach, cogently articulating the Board members' key essential ingredients that reflect their understanding of where the economy is today, what is driving the economy, and what the policy response might be in order for the central bank to address the medium-term macroeconomic challenges and meet its policy objectives. In countries where English is not the official language or is co-official with other languages, the coordinators would be drafting concurrently in both English and the native language(s). The coordinators, working with the Board, would then submit the One-Pagers to the

Chief Economist/Projection Coordinator and other members of their team leading the Projection Round.

## D. After the Projection Round

After locking in the Case Scenarios, and after the Policy Decision is made and the MPR is published, the projection round is considered complete, and the teams begin to prepare for the next policymaking cycle. In the period before the next projection round, the team that served as "back-up" in the prior projection rounds assumes a leading role for the next Projection round. This team takes the responsibility during the weekly macroeconomic monitoring meetings to be prepared with key analysis and stories for the next kick-off meeting to brief decisionmakers about the current economic drivers. Thus, each of the four teams in the MPD has the opportunity to lead the projection round once per year, serve as back-up once per year, and contribute to "planning for the future" for the remaining two quarters of the year. This rotation of teams helps to ensure the sustainability of the processes, while at the same time contributing to an increase in productivity, efficiency, collaboration and motivation.

### Figure 6. Organization of Teams during Projection Rounds

#### Panel A. Annual Rotation Process
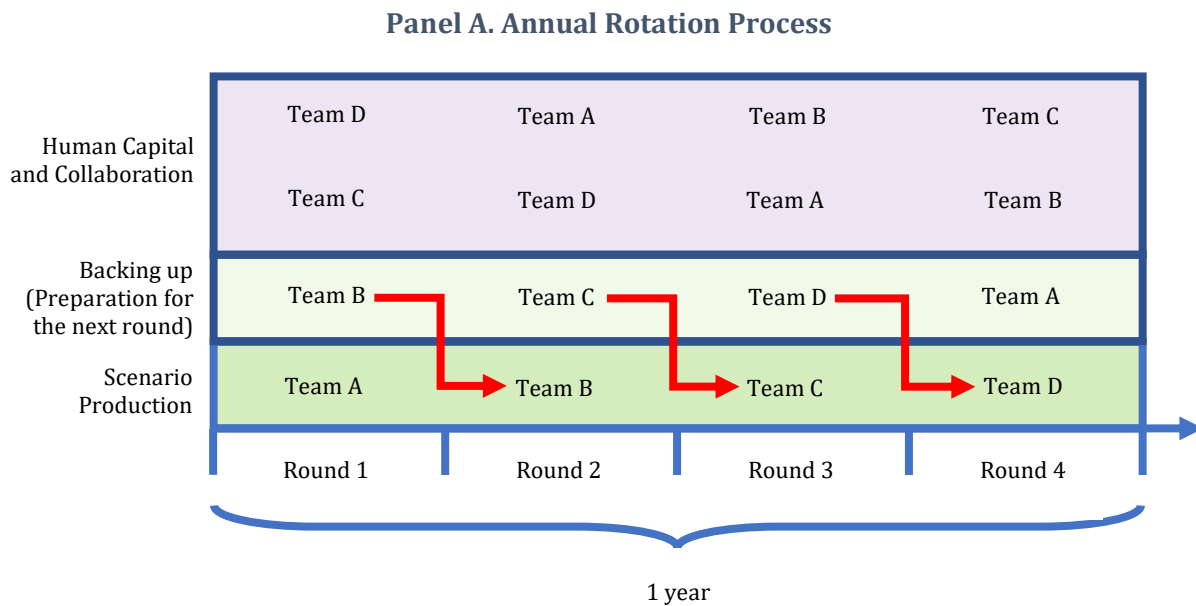


Source: Authors' concept

The key tasks for each of usual 4 teams during and leading up to typical Projection rounds are summarized in panel B on the following page (ex. Round 1, where Team A leads the projection).

## Panel B. Team Roles and Responsibilities during Round 1

| Round 1/Key Processes | Team A (Lead) | Team B | Team C | Team D |
|---|---|---|---|---|
| Building Scenarios (Coordination of the Projection Round) | Fully Involved | Back-up | | |
| MPR | Fully Involved | Back-up | | |
| Internal and External Communication | Fully Involved | Back-up | | |
| Special analysis (Boxes in the MPR) | | Fully Involved | Fully Involved | Fully Involved |
| Assist the Board on One-Pagers | Fully Involved | Back-up | | |
| Weekly Macro Monitoring (Preparation for the next round, since the end of the round) | | Fully Involved | | |
| Other tasks, policy notes, research, model-development, policy analysis; TCCP | | Partly Involved | Fully Involved | Fully Involved |
| Policy Evaluation (during the First round of each year) | | | Fully Involved or Task Force | Fully Involved or Task Force |

Source: Authors' concept

We emphasize the role that FPAS Mark II scenario analysis plays in enabling this increase in productivity and efficiency. In flexible-inflation-targeting central banks that rely on baseline forecasts to communicate policy decisions, significant time and effort is spent working on developing the baseline scenario. Indeed, where the central bank is seen as an expert forecaster, and where the public (mistakenly) believes the path of the baseline forecast to be the policy itself, there is immense pressure on the MPD team to create the perfect forecast. Moreover, because of the role that the baseline plays in communicating policy, there is a major push by policymakers to try to get every idea into the baseline so as to "perfect" it. This consensus-seeking exercise serves as a major time-burden on staff, who have to waste significant time and energy on polishing and re-polishing a baseline that, inevitably, will be false.[5] By doing away with the idea of a baseline forecast in favor of *illustrative* case scenarios that represent potential policy responses to relevant risks, significant time and resources can be saved. No longer do staff need to labor for up to two months each quarter to perfect a baseline; instead, the focus of the projection round can rightfully shift to assessing policy-relevant risks and effectively communicating this thinking to the key stakeholders. Significant time is freed for the team to focus on personal development, policy-relevant research, and intellectual interests. Perhaps most importantly, the time saved by eliminating these inefficiencies can allow team members to devote more time to their family and friends, significantly contributing to their wellbeing, mental health, and work-life balance.

---

[5] As Alsterlind (2017) shows, even the most well-seasoned flexible-inflation-targeting central banks that devote significant resources to developing their baseline forecasts still consistently fail in accurately forecasting the future.

## V. CONCLUSION

This paper is the first in a series of four working papers to be issued in 2023 by the Central Bank of Armenia exploring solutions to the human capital challenges faced by monetary policy departments in central banks around the world. With the introduction of FPAS Mark II, there is an opportunity to eliminate the folly not only in baselines and local approximations, but also, in organizations and processes. This paper highlights how a flatter and more flexible organizational structure and a dynamic learning environment could contribute to a more balanced and efficient policymaking round, which in its turn would alleviate many of the work-life balance burdens imposed by overly laborious processes in place in most central banks today.

# APPENDIX A. PERSONAL DEVELOPMENT ONE-PAGERS

As part of the FPAS Mark II's Dynamic Learning Environment, team members would be expected to immerse themselves in a culture of giving and receiving feedback on an almost instinctive basis. To help team members avoid shying away from constructive feedback, they should be encouraged to constantly focus on understanding what their key areas of growth are, in order to work toward those to become more well-rounded, productive, and happy macroeconomists. As part of this process, team members would be expected to synthesize the feedback they receive in the form of a "one-pager," which highlights their key strengths, as well as their weaknesses. Part of the purpose of the one-pagers is to emphasize and communicate to the rest of the team they are actively working to address these weaknesses, and that they do not shy away from the fact that they have areas where they need to improve.

We present examples of these one-pagers for two team members from the Global Forecasting School of the Central Bank of Armenia. For one-pagers of the rest of the Global Forecasting School, please refer to the link in the footnote.[6]

## Figure A.1. Example of a Feedback One-Pager

**Panel A. Angela Papikyan**         **Panel B. Vahe Avagyan**



Source: Global Forecasting School

---

[6] Refer to https://www.thebetterpolicyproject.org/global-forecasting-school.

To take Angela's one-pager as an example, we can see that she is a master presenter, with additional strengths in critical thinking and creativity. The areas where she needs to improve include writing and in particular economic modeling; she does not shy away from the fact that she still has room to improve and grow in these areas, and proudly highlights this for all to see. Having this information on hand thanks to regular feedback allows her to not only be aware of her strengths and weaknesses, but also, to communicate these to the team as well. When, for example, someone who has a strength in an area where the other seeks to grow (as in the case of writing, above), it can be very easy to pair the two together for hands-on training and mentorship to help cultivate this skill. Being open and honest with feedback is a precursor for this type of dynamic learning to occur.

# APPENDIX B. GFS TESTING PROCESS AT THE CENTRAL BANK OF ARMENIA

**GFS Testing Scheme**
General Overview

**GFS Testing Scheme**
- Question bank of ~20 questions (non-exhaustive) shared with GFS students at beginning of process (see appendix)
  - o Represent hot topics in economics that a good macroeconomist should know, as well as items specific to FPAS Mark II
  - o Questions are deliberately open-ended, and do not necessarily have a single right or wrong answer. Correct answers will be those that synthesize a wide array of information from multiple sources/perspectives, demonstrate critical thinking, provide real-world examples, and represent the authentic opinions of the speaker. Additionally, correct answers should be well-organized, clearly articulated, and reflect the highest quality in speaking/writing/presenting.
- All GFS students must participate in each day's testing, unless cleared for a highly valid excuse by FPAS leadership.
- Students would be expected to keep their videos on at all times and share their screens, to maintain integrity.

**Weekly Schedule**

|  | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| **Format** | **Video Interview** | **Writing Assignment** | **Video Interview** | **Writing Assignment** | **Presentation** |
| **Time** | 12:00-13:00 | 12:00-13:00 | 12:00-13:00 | 12:00-13:00 | 12:00-13:00 |
| **Question** | Question of the Week (shared with students on Monday at 12:00) | Question of the Week | Those who did not score on Monday's video get to reproduce same video; Those who scored move on to new question | Those who did not score on Tuesday's assignment get to reproduce same essay; Those who scored move on to new question | Question of the Week; Slides will be shared on Wednesday (max. 3 slides); Opportunity for students to edit slides during 1 hour |
| **Other Planning** |  |  | FPAS Operations Officer shares Slides for Friday's Presentation | FPAS Operations Officer provides example of good presentation | Output for the week shared with Com; Com publishes weekly CBA Review covering prior week |

<div align="center">

**GFS Testing Scheme**
Standards, Rules, & Expectations for GFS Students

</div>

**Evaluation Procedure**

Implementation Phase

- At the launch of the GFS Testing Scheme, when there are no Level 1 or above economists in the GFS, the tests (interview/written/presentation) will be evaluated by Douglas Laxton, Director of the Better Policy Project. Assignments will be graded on a binary "pass/fail" basis, with passing assignments meeting all of the criteria outlined in the grading section below. Students must receive a passing grade on the requisite number of assignments (10 interviews, 10 essays, and 10 presentations) in order to advance to the next GFS level.
- Students who complete the testing procedure (as outlined above) will be recommended to advance to Level 1 by Mr. Laxton. Armen Nurbekyan (Deputy Governor of the CBA) and Hayk Avetisyan (Acting Head of Macroeconomic Directorate of the CBA) will make a final decision on level advancement based on a review of Mr. Laxton's recommendation as well as a review of the student's qualifying assignments.
- Students will have a maximum of one year to advance to the next level. There is no minimum time required to advance to the next level, other than that imposed by practical time constraints.
- At the discretion of Mr. Laxton, Mr. Nurbekyan, and Mr. Avetisyan, assignments (video interviews, writing assignments, and presentations) completed prior to the formal launch of the GFS testing scheme under similar circumstances and resource constraints can be used to qualify for the next GFS level.

Steady-State

- Once a critical mass of GFS students become certified as Level 1 and above economists, each level would form an Evaluation Committee that would be responsible for grading students in the level below it. For example, a Level 1 Evaluation Committee comprised of Level 1 GFS economists would evaluate those testing for Level 1, a Level 2 Evaluation Committee comprised of Level 2 GFS students would evaluate Level 1 students testing for Level 2, and so on.
- In the event that there are no economists at a higher level to form a committee, Mr. Laxton would be responsible for evaluating these students.
- Students who meet the requirements to move on to the next level would be recommended to Mr. Nurbekyan and Mr. Avetisyan for the final decision, per above.

**Transparency and Accountability**

- All assignments submitted by GFS students as part of the testing scheme (including video interviews, written assignments, and recordings of presentations) shall be maintained in a file-sharing system, accessible to all other GFS students. Assignments that receive a passing grade of 10 shall be marked as such, providing students an opportunity to see examples of what constitutes satisfactory work product.
- The FPAS Operations Officer shall be responsible for managing the files, including timely uploading of assignments to the file-sharing portal, daily reporting of participation and grades, and so on.

**Grading Criteria**

- All assignments will be assigned a score from 0 to 10. Assignments will be evaluated on the following key criteria:
  - Substance (75%):

- Demonstrates full mastery of the subject matter in a nuanced and thoughtful way
- Synthesizes a variety of sources, ideas, and perspectives to make a convincing argument
- Refrains from over-simplifying the subject and does not engage in "elevator economics" (i.e. elementary economic thinking that does not follow common sense or critical judgment)
- Provides ample examples and analytical support for the argument, including real-world examples, citations of relevant economists/papers, and so on.
- Style (25%):
  - Utilizes clear, concise, and articulate language
  - Maintains high degrees of professionalism, consistent with GFS speaking, writing, and presentation standards (including formatting and appearance)
  - Highly organized and structured, with clear progression of ideas and good transitions
  - Engaging and captivating style (e.g. writing: prose, verbiage, syntax; interview/presentation: eye contact, intonation, verbiage)

## GFS Testing Scheme
### Appendix: Question Bank

1. What is the role of the Dilijan Research and Training Center?
2. What are the 3 essential ingredients of FPAS scenarios?
3. What is the difference between a FPAS and non-FPAS central banks?
4. Why do we need models with endogenous policy credibility?
5. What is the folly in local approximations and baseline forecasts?
6. Why is monetary policy transparency and accountability so important?
7. What is Flexible-Inflation Targeting (FIT)
8. What are the six principles of FIT regimes?
9. What are the roles of models in FPAS central banks?
10. What are the differences between semi-structural and DSGE models?
11. What is a Dynamic Learning Environment?
12. What is the Global Forecasting School?
13. What is TCCP?  Training, Coaching and Collaboration
14. Have financial markets priced in how high US interest rates and unemployment may have to go to reduce underlying inflation to 2 percent?
15. Has high levels of government debt increased the world real interest rate?
16. What are the risks associated with high levels of private-sector debt?
17. Why have real 10-year bond rates been so low since the beginning of the 2008 Global Financial Crisis?
18. Was David Ricardo Ricardian?
19. Is the Phillips Curve really a curve?
20. Are there significant risks that US inflation will undershoot the target?

# REFERENCES

Adrian T, D. Laxton, and M. Obstfeld 2018, "Advancing the Frontiers of Monetary Policy."

Alichi, A., 2015, "A New Methodology for Estimating the Output Gap in the United States," IMF Working Paper No. 15/144.

Alichi, A., O. Binizima, D. Laxton, K. Tanyeri, H. Wang, J. Yao, and F.Zhang, 2017, "Multivariate Filter Estimation of Potential Output for the United States," IMF Working Paper No. 17/106.

Alichi, A., O. Bizimana, S. Domit, E. Fernández-Corugedo, D. Laxton, K. Tanyeri, H. Wang, and F. Zhang, 2015, "Multivariate Filter Estimation of Potential Output for the Euro Area and the United States," IMF Working Paper No. 15/253.

Alichi, A., Avetisyan, H., Laxton, MD., Mkhatrishvili, S., Nurbekyan, A., Torosyan, L., Wang, H., "Multivariate Filter Estimation of Potential Output for the United States: An Extension with Labor Market Hysteresis," IMF Working Paper No. 19/35.

Alichi, A., R. Al-Mashat, H. Avetisyan, J. Benes, O. Bizimana, A. Butavyan, R. Ford, N. Ghazaryan, V. Grigoryan, M. Harutyunyan, A. Hovhannisyan, E. Hovhannisyan, H. Karapetyan, M. Kharaishvili, D. Laxton, A. Liqokeli, K. Matikyan, G. Minasyan, S. Mkhatrishvili, A. Nurbekyan, A. Orlov, B. Pashinyan, G. Petrosyan, Y. Rezepina, A. Shirkhanyan, T. Sopromadze, L. Torosyan, E. Vardanyan, H. Wang, and J. Yao, 2018, "Estimates of Potential Output and the Neutral Rate for the U.S. Economy." IMF Working Paper No. 18/152.

Alsterlind, J. 2017. "Common features in short maturity interest rate forecasts." Staff memo, Sveriges Riksbank.

Al-Mashat, R., A. Bulíř, N.N. Dinçer, T. Hlédik, T. Holub, A. Kostanyan, D. Laxton, A. Nurbekyan, and H. Wang, 2018, "An Index for Transparency for Inflation-Targeting Central Banks: Application to the Czech National Bank," IMF Working Paper No 18/210.

Archer D., M. Galstyan, and D. Laxton, 2022, " FPAS Mark II: Avoiding Dark Corners and Eliminating the Folly in Baselines and Local Approximations," CBA Working Paper 22/10/06.

Avagyan V., H. Avetisyan, M. Galstyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, J. Gilbert, H. Karapetyan, Kostanyan A., D. Laxton, J. Laxton, A. Matinyan, A. Nurbekyan, A. Papikyan, and N. Yeritsyan, 2022a, "FPAS Mark II Monetary-Policy-Relevant Output Gaps, December 2022," CBA Working Paper 2022/08, December 2022.

Avagyan V., ____, 2022b, "FPAS Mark II Financial-Cycle Gaps, December 2022," CBA Working Paper 2022/10, December 2022.

Avagyan, V., ____, 2023b, "FPAS Mark II: Armenia Shadow Projection, January 2023," Forthcoming CBA Working Paper, January 2023.

Avagyan, V., ____, 2023c, "FPAS Mark II Monetary-Policy-Relevant Output Gaps, January 2023," Forthcoming CBA Working Paper, January 2023.

Avagyan, V., ____, 2023d, "FPAS Mark II Financial-Cycle Gaps, January 2023," Forthcoming CBA Working Paper, January 2023.

Avagyan, V.____, 2023e, "FPAS Mark II Credit Gaps, January 2023," Forthcoming CBA Working Paper, January 2023.

Avagyan, V., ____, 2023f, "FPAS Mark II: Better Work-Life Balance Issues, April 2023," Forthcoming CBA Working Paper, April 2023.

Avagyan, V., ____, 2023g, "FPAS Mark II: Armenia Shadow Projection, April 2023," Forthcoming CBA Working Paper, April 2023.

Avagyan, V., ____, 2023h, "FPAS Mark II Monetary-Policy-Relevant Output Gaps, April 2023," Forthcoming CBA Working Paper, April 2023.

Avagyan, V., ____, 2023i, "FPAS Mark II Financial-Cycle Gaps, April 2023," Forthcoming CBA Working Paper, April 2023.

Avagyan, V.____, 2023j, "FPAS Mark II Credit Gaps, April 2023," Forthcoming CBA Working Paper, April 2023.

Avagyan, V., ____, 2023k, "FPAS Mark II:  Better Work-Life Balance Issues, July 2023," Forthcoming CBA Working Paper, July 2023.

Avagyan, V., ____, 2023l, "FPAS Mark II:  Armenia Shadow Projection, July 2023," Forthcoming CBA Working Paper, July 2023.

Avagyan, V., ____, 2023m, "FPAS Mark II Monetary-Policy-Relevant Output Gaps, July 2023," Forthcoming CBA Working Paper, July 2023.

Avagyan, V., ____, 2023n, "FPAS Mark II Financial-Cycle Gaps, July 2023," Forthcoming CBA Working Paper, July 2023.

Avagyan, V.____, 2023o, "FPAS Mark II Credit Gaps, July 2023," Forthcoming CBA Working Paper, July 2023.

Avagyan, V., ____, 2023p, "FPAS Mark II:  Better Work-Life Balance Issues, October 2023," Forthcoming CBA Working Paper, October 2023.

Avagyan, V., ____, 2023q, "FPAS Mark II:  Armenia Shadow Projection, October 2023," Forthcoming CBA Working Paper, October 2023.

Avagyan, V., ____, 2023r, "FPAS Mark II Monetary-Policy-Relevant Output Gaps, October 2023," Forthcoming CBA Working Paper, October 2023.

Avagyan, V., ____, 2023s, "FPAS Mark II Financial-Cycle Gaps, October 2023," Forthcoming CBA Working Paper, October 2023.

Avagyan, V.____, 2023t, "FPAS Mark II Credit Gaps, October 2023," Forthcoming CBA Working Paper, October 2023.

Barrero, J., N. Bloom, S. Davis, B. Meyer, 2021, "COVID-19 Is a Persistent Reallocation Shock," Center for Open Science.

Benes, J., K. Clinton, R. Garcia-Saltos, M. Johnson, D. Laxton, P. Manchev, and T. Matheson, 2010, "Estimating Potential Output with a Multivariate Filter," IMF Working Paper No. 10/285.

Benes, J., M. Kumhof and D. Laxton, 2014a. "Financial Crises in DSGE Models; A Prototype Model," IMF Working Papers 14/57, International Monetary Fund. Benes, J., M. Kumhof and D. Laxton , 2014b. "Financial Crises in DSGE Models; Selected Applications of MAPMOD," IMF Working Papers 14/56, International Monetary Fund.

Benes, J., D. Laxton and J. Mongardini, 2016. "Mitigating the Deadly Embrace in Financial Cycles; Countercyclical Buffers and Loan-to-Value Limits," IMF Working Papers 16/87, International Monetary Fund.

Blagrave, P., R. Garcia-Saltos, D. Laxton, and F. Zhang, 2015 "A Simple Multivariate Filter for Estimating Potential Output," IMF Working Paper No. 15/79.

Bloom N., S. Davis and Y. Zhestkova, 2020, "COVID-19 Shifted Patent Applications Toward Technologies that Support Working from Home," Working Papers 2020-133, Becker Friedman Institute for Research In Economics.

CBO Paper, 2011, "CBO's Method for Estimating Potential Output: An update."

CBO Paper, 2014, "Revisions to CBO's Projection of Potential Output Since 2007."

Clinton, K., Freedman, C. Juillard, M. Kamenik, O. Laxton, D. and Wang, H., 2015, "Inflation-Forecast Targeting: Applying the Principle of Transparency," IMF Working Paper No. 15/132.

Davis S., 2020, "How COVID-19 Is Disrupting Business, Financial Markets, and Public Policy," Interview Conducted March 31, 2020. https://www.chicagobooth.edu/review/steven-j-davis-how-covid-19-disrupting-business-financial-markets-and-public

Davis S., D. Liu, and X. Sheng, 2020, "Stock Prices, Lockdowns, and Economic Activity in the Time of Coronavirus," Working Papers 2020-156, Becker Friedman Institute for Research In Economics.

Drehmann, M., and J. Yetman, 2018, "Why you should use the Hodrick-Prescott filter – at least to generate credit gaps", BIS Working Papers, No 744.

Freedman, C., M. Kumhof, D. Laxton, D.Muir, and S. Mursula, 2010, "Global Effects of Fiscal Stimulus During the Crisis," Journal of Monetary Economics, Bol. 57 (June), pp. 506-526.

Gaspar, V., M. Obstfeld, R. Sahay, D. Laxton, D. Botman, K. Clinton, R. Duval, K. Ishi, Z. Jakab, L.J. Mayor, C.L. Ngouana, T.M. Griffoli, J. Mongardini, S. Mursula, E. Nier, Y. Ustyugova, H. Wang, O. Wuensch, 2016, "Macroeconomic Management When Policy Space Is Constrained: A Comprehensive, Consistent and Coordinated Approach to Economic Policy" IMF Staff Discussion Note No 16/09.

Haworth C., A Kostanyan and D. Laxton, 2020, "History of Inflation Targeting in New Zealand," London School of Economics and Political Science.

Hodrick, R.J., and E.C. Prescott, 1997, "Post-War U.S. Business Cycles: An Empirical Investigation," Journal of Money, Credit and Banking, Vol. 29(1), pp. 1–16.

Hofmann, B., and B. Bogdanova, 2012, "Taylor rules and monetary policy: a global "Great Deviation"?,"BIS Quarterly Review, Bank for International Settlements, September.

Kostanyan A., D. Laxton, J. Romero, V. Avagyan, H. Avetisyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, M. Galstyan, J. Gilbert, H. Karapatan, J. Laxton, A. Matinyan, A. Nurbekyan, A. Papikyan, and N. Yeritsyan, 2022a, "FPAS Mark I Central Bank Transparency and Credibility Measures," CBA Working Paper 2022/05.

Kostanyan A., A. Matinyan, A. Papikyan, V. Avagyan, H. Avetisyan, M. Galstyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, J. Gilbert, H. Karapetyan, D. Laxton, J. Laxton, A. Nurbekyan, and N. Yeritsyan, 2022b, "Getting FIT with Imperfect Policy Credibility. DYNARE/JULIA Workshops with an Application for the US Economy," CBA Working Paper 2022/04.

Kostanyan A., ____, 2022c, "Getting FIT with Imperfect Policy Credibility. DYNARE/JULIA Workshops with an Application for a Small Open Economy," CBA Working Paper 2022/07.

Kostanyan A., D. Laxton, J. Romero, V. Avagyan, H. Avetisyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, M. Galstyan, J. Gilbert, H. Karapatan, J. Laxton, A. Matinyan, A. Nurbekyan, A. Papikyan and N. Yeritsyan, 2023a, "FPAS Mark II Central Bank Transparency and Credibility Measures," Forthcoming CBA Working Paper, January 2023.

Kostanyan A., D. Laxton, J. Romero, V. Avagyan, H. Avetisyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, M. Galstyan, J. Gilbert, H. Karapatan, J. Laxton, A. Matinyan, A. Nurbekyan, A. Papikyan and N. Yeritsyan, 2023b, "FPAS Mark II Central Bank Transparency and Credibility Measures," Forthcoming CBA Working Paper, October 2023.

Kostanyan A. and D. Laxton, 2020, "Time to Change the Bank of Canada's Mandate," London School of Economics and Political Science.

Kumhof, M. and D. Laxton, 2007, "Improved Macroeconomic Performance Good Luck or Good Policies", Box 5.2 of Chapter 5 of the October 2007 World Economic Outlook, International Monetary Fund.

Laubach, T. and John C. Williams, 2003. "Measuring the Natural Rate of Interest," The Review of Economics and Statistics, MIT Press, vol. 85(4), pages 1063-1070.

Laxton D. and C. Rhee, 2022a, "Reassessing Constraints on the Economy and Policy: Some Lessons from Unconventional Monetary Policy for Small Open Economies and Emerging Markets," Economic Policy Symposium - Jackson Hole, Federal Reserve Bank of Kansas City.

Laxton D. and C. Rhee, 2022b, "Implementing Summers' "Adversarial Collaboration" with Scenarios-Based Conventional Forward Guidance," BoK upcoming Working Paper.

Okun, A.M., 1962, "Potential GNP: Its Measurement and Significance," in Proceedings of the Business and Economic Statistics Section, pp. 98-104 (Washington: American Statistical Association).

Papikyan, A., V. Avagyan, H. Avetisyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, M. Galstyan, J. Gilbert, H. Karapatan, A. Kostanyan, D. Laxton, J. Laxton, A. Matinyan, A. Nurbekyan, and N. Yeritsyan, 2022a, "Not the Teal Book," CBA Working Paper 2022/06.

Papikyan A. and \_\_\_\_, 2022b, "Not the Teal Book," CBA Working Paper 2022/09, December 2022.

Papikyan A. and \_\_\_\_, 2023a, "Not the Teal Book," Forthcoming CBA Working Paper, January 2023.

Papikyan A. and \_\_\_\_, 2023b, "Not the Teal Book," Forthcoming CBA Working Paper, March 2023.

Papikyan A. and \_\_\_\_, 2023c, "Not the Teal Book," Forthcoming CBA Working Paper, May 2023.

Papikyan A. and \_\_\_\_, 2023d, "Not the Teal Book," Forthcoming CBA Working Paper, June 2023.

Papikyan A. and \_\_\_\_, 2023e, "Not the Teal Book," Forthcoming CBA Working Paper, July 2023.

Papikyan A. and \_\_\_\_, 2023f, "Not the Teal Book," Forthcoming CBA Working Paper, September 2023.

Papikyan A. and \_\_\_\_, 2023g, "Not the Teal Book," Forthcoming CBA Working Paper, October 2023.

Papikyan A. and \_\_\_\_, 2023h, "Not the Teal Book," Forthcoming CBA Working Paper, December 2023.

Saunders, T. and P. Tulip, 2019, "Cost-benefit Analysis of Leaning against the Wind", RBA Research Discussion Paper, RDP 2019-05.

Svensson, Lars E.O., 2017, "Leaning Against the Wind: The Role of Different Assumptions About the Costs", NBER Working Paper Series No. 23745.

Taylor, J., 2019, "Reform of the International Monetary System Why and How?", MIT Press.

Tchanturia, M., V. Avagyan, D. Laxton, H. Avetisyan, M. Gevorgyan, E. Hovhannisyan, H. Igityan, M. Galstyan, J. Gilbert, H. Karapatan, A. Kostanyan, J. Laxton, A. Matinyan, A. Nurbekyan, A. Papikyan, and N. Yeritsyan, "The Return of Bottlenecks and Convex Phillips Curves," Forthcoming CBA Working Paper, February 2023.

Turner, D., M. C. Cavalleri, Y. Guillemette, A. Kopoin, P. Ollivaud and E. Rusticelli, 2016, "An investigation into improving the real-time reliability of OECD output gap estimates," OECD Economics Department Working Papers 1294, OECD Publishing.

Wessel D., 2020, "COVID-19 and the Economy: Your Questions, our Answers," Brookings Blog, April 1, 2020.
https://www.brookings.edu/blog/up-front/2020/04/01/covid-19-and-the-economy/

Wolla S., 2021, "Minding the Output Gap: What Is Potential GDP and Why Does It Matter?," Page One Economics Newsletter, Federal Reserve Bank of St. Louis, May.