# Diagnosing the Binding Constraints to Better Jobs: An Approach and Framework

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# Diagnosing the Binding Constraints to Better Jobs: An Approach and Framework[1]

Good jobs are often a key economic issue in advanced and developing economies alike. Jobs outcomes that are socially sub-optimal, inefficient, or inequitable vary a great deal by country, but can include high unemployment, low or unequal real wage growth, high youth unemployment, or disparate jobs outcomes by gender or ethnicity. As with any problem, making progress against jobs problems in a meaningful and lasting way requires, in the first instance, a clear understanding of their key causes. This document builds on and cross references existing Jobs Group guidance for conducting a jobs diagnostic, summarized well in the Jobs Group's recent [course material](#).

The steps in conducting a jobs diagnostic are broadly as outlined below.

First, before directly using this framework, descriptive analysis is done to *frame or identify the main jobs problem(s)* by examining a set of outcomes and trends at a relatively aggregate level, benchmarking them against relevant comparators or expectation, and identifying the adverse outcomes – the "jobs problem" – (generally referred to as "Step 1" in the [Jobs Diagnostics: A Step by Step Guide](#).) A jobs problem can be something like "low contribution of the female labor force," "high structural unemployment," "stagnant labor productivity," slow or non-existent transition out of agriculture / low productivity modes of work (such as in informal self-employment)" or other, possibly more specific aggregate outcomes. A country may have a combination of jobs problems, and some jobs problems tend to occur together. The key thing is that these are outcomes that do not, on their own, point to policy, as their causes have not been diagnosed. Some of the data work involved in framing the jobs problem(s) can be performed using standardized in tools which utilize macro and micro/household data. Some can be done using standardized indicators from World Bank Enterprise Surveys. Indicators of trends in GDP by sector, employment by sector, and labor productivity by sector are cornerstones to this early step and will inform the diagnostic process. The Jobs and Structural Change Tools and the Jobs Diagnostic Labor Market Tool are both located here: [here](#).  In addition, teams can use [a guided enquiry to the jobs problem](#) and [guided enquiry on fim dynamics](#) to provide a more detailed understanding of the country's jobs problem, and, importantly, clues or indicators of underlying constraints for use in subsequent diagnostic steps. Thus, it is usually convenient to use the standard tools to pin down and elaborate the jobs problem, though this step will also provide some clues to, or narrow down, the possible causes. The steps delineated are not strictly separable when it comes to the thought process and interpretation of data, however. The diagnostic process is iterative and integrated.

Once the analyst has investigated trends, decompositions, and other outputs of the standard tools, further inquiry is needed in a second, diagnostic step (STEPs 2-3 from [Jobs Diagnostics: A Step by Step Guide](#)) to *diagnose the key causes* of the Jobs Problem, including the determination of whether it is fundamentally a labor demand or supply problem (Step 2 in that publication). "Causes" in this context means the policy, institutional, and structural-historical factors that are binding on better jobs outcomes – i.e., the resolution of which would have a large positive impact on the jobs problem. Causes may operate together to constrain better jobs outcomes in that alleviating one of them would render the other(s) not as constraining. Both macro and micro indicators may be used throughout the diagnostic phase, which we break into two broad steps, 2A—considering dynamic

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equilibria; and 2B—the diagnosing constraints using the jobs diagnostic tree, which forms the main substantive contribution of this note.

**A.** Step 2A asks analysts to consider to what extent the economy may suffer from a low level equilibrium—low aggregate consumption demand which results in low demand for labor on the part of producers of goods and services for domestic consumption. This could be an issue if opportunities for export trade are blocked or costly *and* domestic incomes are low. This could be reinforced by low government expenditures on domestically produced goods and services.

To answer whether a low-demand equilibrium is a key factor for jobs outcomes, one asks:

1. *Do trends indicate stagnant consumption demand for goods and services?* Indicators include trends in aggregate demand and its composition (consumption, investment, government expenditure, and net trade); low capacity utilization (particularly for cyclical issues).

   a. *If so, to what extent is this due to low growth in incomes? Are trends in average income flat?* (Indicators include average income or wages over time).
   b. *If so, to what extent is this due to the dominance of basic foodstuffs in household budgets (given high poverty levels)[2]* Indicators include: trends in the headcount poverty rate, in domestic consumption of non-staple foods, and in the non-food share of consumption.
   c. *If so, do high savings and/or inefficient and excessive rates of investment in foreign-sourced capital equipment unduly constrain demand for domestically produced goods and services?[3]* (Are savings "too high" for the country's level of GDP per capita and interest rates? (If so, are interest rates high due to distortions in financial markets or crowd out?) Is investment demand being met to an unusual extent by imported capital goods as well?

2. *Or is consumption demand being met by imports?* (Import penetration and mix by raw materials, intermediate goods, consumer goods, capital goods. If so, the lack of jobs is not due to inadequate consumption demand, but other factors that make domestic producers uncompetitive with imports.

After consideration of the possibly limiting dynamics of consumption demand above for context, the analysis must turn to the consideration of specific constraints to job creation lying in policy or market failures. The analysis of how binding various constraints are must be comprehensive so that candidate constraints are not ignored or missed. However, as clues are assembled, some constraints can be more quickly eliminated from consideration as binding and indeed branches of a decision tree type of structure can facilitate the prioritization of analysis where the weight of the evidence tends to direct it. The framework provided also provides a logic for interpreting the array of symptoms and clues in light of the jobs problems and dynamics studied above.

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[2] Under Engel's Law, consumption preferences are not homothetic – that is, the share of consumption comprised of food tends to fall as incomes rise.

[3] Although this is not expected to be a common driver, given typically low rates of saving and investment in LDC's, we include this possibility for completeness. In state-oriented economies in particular, this possibility may be more likely.

STEP 2B: Further diagnostic tests of binding constraints. This process requires a tailored approach in which the analyst poses and tests hypotheses using country-specific data. However, the effort can be focused based upon the findings of step 1, and outputs of standardized tools provide ready answers to many diagnostic questions.

# Diagnostic Tree

## Introduction

Figure A, presented below in a series of graphics, is a logical framework to guide an objective, data-driven, and exhaustive diagnosis of the binding constraints to better jobs for more people. A single, comprehensive diagnostic tree (split into sub trees for readability) facilitates the isolation of those causes that are binding and the elimination of those that are not. It aims to present the full set of possible proximate causes of poor jobs outcomes as well as deeper drivers of those proximate causes. It contains primarily factors that are broadly within a given country's control; although, for completeness, a few constraints beyond its control are depicted in white boxes. Each potential constraint has roots in market failures, broadly defined, including those arising from (i) asymmetric information and incomplete contracting; (ii) incomplete risk markets; (iii) public goods; (iv) natural monopoly; (v) market power; (iv) coordination failures; and (v) spillovers or externalities, as well as inadequate or poorly conceived or implemented government interventions to address these failures.

At a given level in the diagrams, each shape represents an alternative or competing explanation to the others at the same level. (The size of shapes is by no means an indication of likely binding-ness). By testing symptoms of the alternatives, one can distinguish among them based on empirical evidence. Working through the tree, the analyst rules in or out alternative branches and sub-branches as areas of binding constraints by asking repeatedly: *If this issue/factor were the binding constraint to better jobs outcomes, what pattern would I see in the data, and do I see that pattern?* Thus, the analyst conducts a series of checks of "symptoms" or hypothesis tests.

Starting at the top of the tree, one may determine that an outcome such as the level of employment or labor income is deemed to be low, whether for the country's entire labor force or a segment of it. If so, it is necessary to determine whether that is primarily due to labor market frictions and/or either low demand or low supply of (the relevant) workers. For reasons of economic logic, although both demand and supply of a factor may not be high, both cannot be simultaneously binding for a given labor market. Low employment on its own is not an indication of which side of the market is binding. To illustrate this, Figure 1 shows identical levels of employment (or production/consumption of a good or other factor), Q*. On the left hand side, demand is relatively low; whereas on the right hand side, it is the supply of labor (or other factor) that is particularly low. Even though Q* is the same, the price of labor (the wage) is high only when supply is low relative to demand. Once the evidence is examined to determine whether demand or supply side

constraints are more binding, the possible reasons for this are examined using further empirical indicators or tests of possible reasons, proceeding down the relevant branch(es).

Still at the top of the tree, the middle branch, representing high labor market frictions, can exacerbate either low demand or low supply of labor or constitute its own binding



*Figure 1: Contrasting Low Demand v. Supply with Equivalent Quantity*
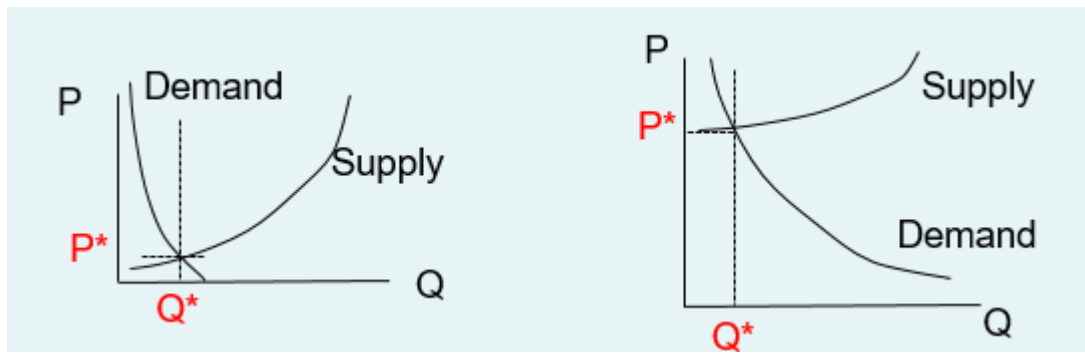
constraint. For all jobs diagnostics some investigation along this branch is warranted. The difficulty will often be a lack of data to fully explore all issues, but unresolved analytical gaps due to lacking data can shape future data collection efforts. Nonetheless, because some frictions are to be expected in any labor market, the analyst should examine the data to ascertain how important such frictions are relative to other constraints.

Although the tree logic works from top to bottom, analysis can also be done along various nodes and the logic of the tree structure invoked primarily at the prioritization stage once all of the available evidence has been marshalled. For example, there may be evidence for a certain country that on the whole labor demand is more binding than labor supply, and therefore more attention paid to analyzing the demand constraining issues. Yet for certain groups, such as low skilled, female, or young workers, labor supply may appear more binding. In that case, both labor demand and (for some workers) labor supply issues may require further investigation.

The logic of demand and supply is applicable throughout much of the tree. In particular, if the evidence directs the inquiry to sub-tree (IV), which is designed to frame the diagnosis of binding constraints to private economic activity, as with labor markets it is logically problematic to conclude that there are economywide binding constraints in all three branches of that tree — high demand for finance, combined with low private returns to investment or low ability to invest (due to barriers to entry). One can nonetheless obtain different findings regarding the degree of binding-ness at a sectoral level. For example, poor utilization of natural resources may be binding for agriculture, whereas the lack of electricity or trade barriers may be binding for manufacturing.

In addition, the distinction between supply and demand for labor may be considered at the sector level, considering the linkages among sectors. For example, if the demand for

labor in the off-farm sector is low relative to supply (i.e., more binding), it would be problematic to conclude that low agricultural productivity is a constraint to labor supply to those off-farm sectors.

Some issues, such as skills or labor market regulations, appear more than once in the tree. This is because the precise symptoms or effects of the constraint may differ. For example, a skills mismatch may comprise a key friction in the labor market that constrains better jobs outcomes, without human capital in general being a binding constraint to economic growth. Alternatively, the general lack of educational attainment may constrain growth (and inclusion), without there being a mismatch in the skills market (wherein there is a simultaneous over-supply of some skills and under-supply of others, relative to demand). Distinguishing more precisely among such potential issues and their channels of impact is important not only for ensuring that priority issues are clearly identified, but also to design better informed interventions with greater likely impact.

Analysts may, when exploring root causes, discover common roots of various constraints that emerge as important and binding in the tree. In this case, it is beneficial to characterize a syndrome, as it describes a common set of symptoms, which may have similar causes. For example, poor governance of fiscal resources may show up as high macro risk, as well as slow productivity growth, and a high cost of finance to the private sector (due to crowding-out), which together produce low investment and low labor demand. Analysts may also consider systems of causal relationships wherein certain constraints reinforce each other or high level constraints (such as a lack of education and road infrastructure) have a common cause (such as low or poorly allocated public expenditures). It is important to pay careful attention to the logic of such possible systems, however, including whether they are consistent with the logic of general equilibrium or factor price adjustments. Within the diagrams, also shown are factors that are not related to policy issues or market failures, such as immutable geography or historical factors. Those nodes are not colored in as are the rest of the factors but are depicted in white.

To arrive at conclusive results requires the use of multiple indicators / tests and often novel use of available data and information. In addition to labor force-, household-, firm-, sector, macro, price, and other data, analysts should take into account existing relevant econometric and other studies and reports. Determining whether any given indicator or outcome is "high" or "low" requires that one benchmark it, typically against countries at a similar level of development and with similar structural features. For example, to determine whether jobs outcomes and trends, GDP growth rates, investment levels, quality of public and infrastructure services, skills levels, and other variables are "worse" than expected, analysts must compare them with countries both in the same region and outside it, at a similar level of GDP per capita, and with similar key geographic characteristics (such as being on the sea, having natural resource wealth).

At times, test results may be mixed, which could indicate the need for further testing. Some constraints may be emerging or near-binding. In principle, it is best to consider all plausible possibilities before reaching conclusions regarding which are binding. However,

when indicators suggest that a binding constraint probably lies within a given branch, more analytical efforts should be devoted to confirming and further refining the diagnosis of deeper causes in that branch. Less emphasis can then be placed on examining possibilities that are not consistent with an initial screen of indicators.

One should always conduct such an analysis at the country level, because the constraints identified are likely to impact many significant sectors or segments of the labor market (or regions within a country). However, more disaggregated analysis can also be conducted for a given economic sector and/or firm type (such as formal firms, household-based agriculture, inter alia). As depicted, once binding constraints are identified, potential root causes should also be examined prior to designing interventions.

# Figure 2:  Summary Jobs Diagnostic Framework (Top Branches)
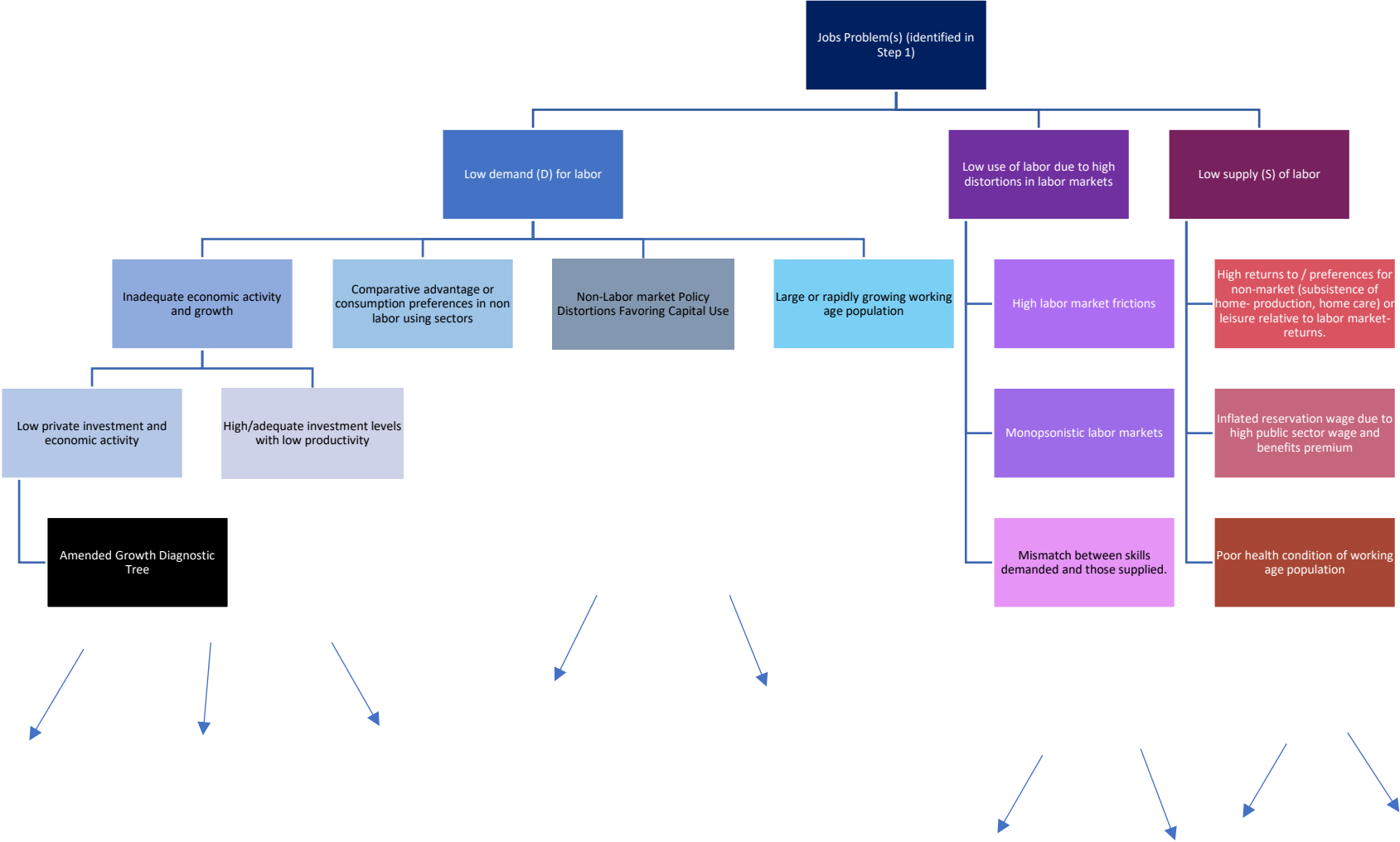
**Figure 3: Detailed Diagnostic Framework**

# Jobs Problem(s) (From Step 1)
## (For all or a segment of the working age population)

## I. Low demand (D) for labor

**Key Signs:**

• High and/or rising unemployment and/or under-employment (low hours worked relative to desired), high level of discouraged workers, coupled with low or falling labor force participation.

• Low real wages and/or real wage growth.

• Weak structural transformation, high rate of unproductive employment.

• High and/or rising rates of self-employment, unpaid family work, and micro enterprises, and conversely, low and slow growing share of waged employment in non-micro firms in total employment

• High out-migration of workers.

## II. Low use of labor due to high distortions in labor markets

**Key Signs:**

• Adequate economic growth with low elasticity of job creation to growth

• High unemployment combined with high job vacancies.

• Low unemployment for some skills or skill levels, coupled with high unemployment for others.

• High wedge between market revenue product or productivity of labor and wage.

• Unusually high wage gaps without labor force shifts.

• Emigration of workers with one skill level and high use of foreign workers with another level.

## III. Low supply (S) of labor

**Key Signs:**

• Low labor force participation *coupled with* high and/or rising wages for all skill levels, low unemployment rates, and/or increasing capital intensity of production.

• Increased work permits/in migration of low/moderately skilled workers.

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# I. Low demand for labor (relative to supply)

## IA. Inadequate economic activity and growth

### IAi. Low private investment and economic activity

### IAii. High/adequate investment levels with low productivity

IV. Growth Diagnostics Tree (adapted from HRV 2005)

High public investment with low efficiency

Many new and existing firms operating at unproductive scale and with unproductive techniques or input combinations (See II., IV.)

IB. Investment and production in non-"labor-using" sectors and/or technologies due to inherent comparative advantage or demand patterns

IC. Non-labor policies favoring capita-using or augmenting technologies. (e.g., capital subsidies).

ID. Large or rapidly growing working age population

Recent or current high fertility rates

Root Causes

# II. High labor market distortions (augmenting or causing excess demand or supply of labor)

## IIA. High labor market frictions

**IIAi.** High costs and/or risks of labor regulation, taxation, or collective bargaining

**IIAii.** High information asymmetry in labor markets (including high search and matching costs, unknown labor quality, and enforce-ment)

**IIAiii.** Discrimination against groups of workers

**IIAiv.** High costs of spatial or other job moves

**IIAv.** Costly connectivity to labor markets

Costly or low quality transport or electronic connections to workplace

**IIB.** Monop-sonistic labor markets

**IIC.** Mismatch between skills demanded and those supplied.

Inadequate education and skills training systems, job market information, or support to students

Root Causes

# III. Low Supply of Labor

**IIIA. High returns to / preferences for non-market (subsistence of home- production, home care) or leisure relative to labor market- returns.**

**IIIB. Inflated reservation wage due to high public sector wage and benefits premium**

**IIIC. Poor health condition of working age population**

IIIAi. High costs and risks in food markets

IIIAii. Lack of market-based substitutes for home-based production

IIIAiii. Cultural factors, social restrictions, expectations of discriminatory treatment. (Cross reference findings of IIAiii.)

IIIAiv. Poor transport and workplace safety conditions

III Av. High public or private transfer payments

High preference for leisure.

Root Causes
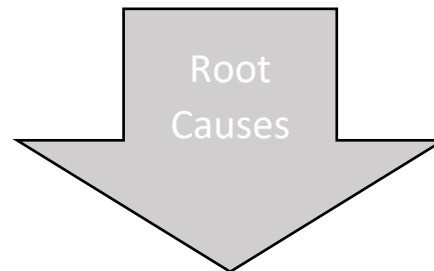
# IV. What constrains private investment and economic activity?

## IVA. Low Private Returns to Economic Activity

### IVAi. Low Appropri-ability of returns

V. High macro risks and distor-tions

VI. High micro risks and distor-tions

### IVAii. Low Social (Intrinsic) Returns

Low domestic consumption demand (STEP 2A) Must be accompanied by high trade barriers under VI.

IVAiia. Ineffi-cient use of natural capital

IVAiib. Low natural capital endow-ment

IVAiic. Low human capital

IVAiid. Poor infra-struc-ture

## IVB. High Barriers to Entry / Low contestability

IVBi. Private market power, uncompetitive behavior

IVBii. High state ownership of productive sectors

## IVC. High Cost of Finance

### IVCi. Costly Local Finance

Low Savings

Costly Intermedia-tion

### IVCii. Costly Foreign Finance

High country risk

Regulatory barriers to foreign finance

Root Causes

# V. High Macro Risks and Distortions

| VA. High, unpredictable inflation | | | VB. Dutch Disease | VC. Distortionary exchange rate | Low global/aggregate demand |
|---|---|---|---|---|---|
| Fiscal/monetary mis-management | Domestic production shock(s) coupled with lack of storage and trade | Imported Inflation / external supply shocks | High natural resource wealth | | |

Root Causes

# VI. High Micro Risks and Distortions

**VIA. High/risk-augmenting taxation of economic activity**

**VIB. Inadequate guarantees of property rights via weak:**

- VIBi. Control of corruption
- VIBii. Rule of law, stability, and security
- VIBiii. Property Rights: Legal protections for share-holders, land-holders intellectual property holders.

**VIC. High or highly arbitrary/uncertain regulatory burden of:**

- VICi. Product market regulation
- VICii. Trade Barriers (own, by others)
- VICiii. Controls on investment
- VICiv. Labor / input market regulation (see also II.A.i)

**VII. Market Failures in Innovation**

**VIII. Market Failures in Information, Coordination and Agglomeration**

- VIIIA. Spatial dimensions: Failure to invest at efficient level over space (lagging or booming regions) and achieve spatial agglomeration
- VIIIB. Coordination failures among producers e.g., to signal quality and meet market access conditions

Detailed Root Causes

# VII. Market Failures in Innovation

## VIIA. High unexploited technology spillovers

## VIIB. High unexploited learning by doing

**VIIAi.** Inability to capture returns to innovation such as through patent protections

**VIIAii.** Barriers to foreign direct investment or expertise.

**VIIBi.** Low incentives or high obstacles to learning and risk taking (e.g., bankruptcy protections)

Low initial experience and exposure to markets, disadvantageous location in product space

Root Causes
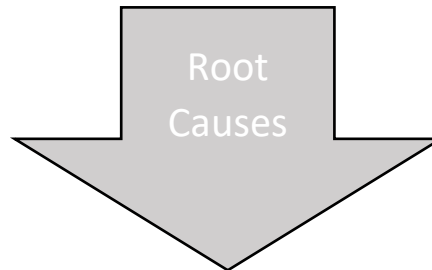
## Symptoms and Selection of Alternative Diagnoses

The [Mindbook](Mindbook) (Hausmann, Klinger, and Wagner (HKW), 2008) provides useful inspiration for analysts seeking to devise tests of binding-ness, in HKW's case with respect to economic growth. They proposed four general categories of "tests" of binding constraints, which can be adapted to tests of binding constraints to jobs outcomes. Tests of binding-ness are designed to assess whether a factor or condition has a high "shadow value," because in that case alleviating the constraint would have a high impact on the economy or, in our case, on jobs outcomes.

That is, supply of a factor, such as a flexible labor markets or efficient transportation to work, should be low relative to its demand. Low supply can be caused by many factors, but unless there is high demand for whatever is constraining supply, the causal factor is not binding. When the shadow value is high and the constraint is binding, economic agents experience an appreciable cost from it. For example, the direct cost of labor taxation to the entrepreneur or firm would have to be high to affect hiring behavior and be binding.[4] Second, economic actors should be engaged in costly behaviors or adaptations to circumvent a constraint if it is binding (such as employing high cost foreign workers, generating their own electricity, hiring security personnel, or paying bribes to circumvent onerous regulations). In addition, if a constraint is binding, there should be relatively few economic entities present in the economy that would depend on the constrained factor; for example, few firms dependent on high skills if such skills were a binding constraint. And finally, a high-level economic outcome such as the rate of creation of better jobs, private investment, or GDP, should respond positively when the constraint is relaxed, without conditioning for other factors. While many factors can have an impact, for a factor to be binding its impact should overwhelm the impacts of others (though of course, analysts should be careful not to draw specious inferences and should test a variety of hypotheses that could explain a high correlation.)

In the next section we list a number of possible symptoms and suggested hypothesis tests (in progress), which are examples to motivate further thinking by the analyst of a particular case. These are only illustrative, not exhaustive. The analyst, in drilling down into a particular case, must take a flexible and creative approach to devising hypothesis tests using the available data.

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[4] Depending on the respective elasticities, high labor taxation, if borne by the worker, may also reduce labor supply.

# *I.  Low Demand for Labor*

<u>Key Signs:</u>

- High and/or rising unemployment, discouraged workers (leading to low labor force participation)
- Low real wages and/or real wage growth.
- Weak structural transformation, high rate of relatively unproductive employment / self-employment, and low level of job creation by structured (or formal) firms with at least 3-5 workers.
- High net out-migration of workers regardless of skill.
- Low firm-level growth in number of employees, particularly off-farm (average percent change per annum since firm started).
- Employment responds to the degree expected to economic growth / sector growth, including through temporary migration and other responses on the part of workers.

## IA. Inadequate Economic Growth:  Low, highly variable, or un-sustained growth spells.

### IAi. Low Private Investment and Economic Activity

- Private investment as a share of GDP low.
- Foreign direct investment in non-resource extraction sectors is low.
- Low rates of firm entry.

### IAii. High/adequate investment levels with low productivity.

- Private investment as a share of GDP is as expected or higher, but total factor productivity levels and growth rate are low.
- Firms enter but operate at unproductive scale, with a high proportion micro-enterprises. Diagnose reasons under II and IV.
- Firms enter but at a high level of formality. Diagnose reasons under II and IV.

## IB. Low consumption demand or intrinsic comparative advantage in labor-employing sectors

- Revealed comparative advantage in capital-intensive sectors or low labor using sectors, coupled with high un- or under-employment.
- Low or narrowly based (low labor using- sector) penetration of export markets and high un- or under- employment.
- Low imports of manufactured goods and services (MGS), coupled with MGS's comprising a low share of overall consumption in the economy.
- A large response of MGS jobs to positive exogenous agricultural income shocks (e.g., producer/global price increases or rainfall-related yield shock).
- Decline in the share of jobs in manufacturing and services is Granger caused by declining consumption for the non-poor or more affluent segment of the population.

## IIC.  Large or rapidly growing working age population (with adequate growth and normal job creation):

- Growth of absolute size of working age population exceeds the (otherwise adequate and health) growth of jobs in the formal and/or off-farm sector, with high economic growth.

## II.      *High Labor Market Distortions:*

**Key Signs:**

- Adequate/high economic growth with low elasticity of job creation to growth
- High unemployment combined with high job vacancies.
- Low unemployment for some skills or skill levels, *coupled with* high unemployment for others.
- High wedge between market revenue product of labor and wage (proxied by average costs of wage bill per worker in enterprise surveys relative to labor productivity).
- Divergent trends between real wage growth and value added per worker (from JoIn and macro tools);
- Firms employ few workers as a share of capital or sales.
- Firm requiring more labor input or skilled workers have lower returns to capital and / or do not survive and thrive.
- High capital-labor share of output relative to countries with similar incomes.
- Low labor income share of GDP.
- Low elasticity of job creation to growth, by broad sector (industry, manufacturing, services). Sectors using less labor per unit of capital do not survive and thrive.
- Low employment creation in response to foreign direct investment (FDI).
- Lower returns to capital in sectors with more workers / capital invested.


## IIA.  High Labor Market Frictions

### IIAi. High costs and/or risks of labor regulation, taxation, or collective bargaining

- Little formal job creation and formal labor mobility.
- Firms operate at too small a scale / with too
- Unusually high level of self-employment (for country's income level), contract, and temporary work;
- High frequency of micro enterprises with no or few paid workers;
- High labor informality relative to firm informality.
- Firms take concerted, costly or risky steps to avoid paying labor contributions.
- Minimum wage / per capita GDP, relative to average formal low skill wage is high.
- Wage distribution bunches at minimum wage
- High share of firms claim that labor regulations are a major or severe obstacle (relative to other countries).
- Labor regulations – requirements to hire and fire, pay severance, and requirements of permanency, inter alia — are stringent or costly (data from Doing Business Employing Workers, ASPIRE/WDI/JobStructures Policy/Context Tool).
- Employment levels increase in periods when regulatory constraints (e.g., minimum wage or labor taxes) are relaxed.
- Firms falling into regulatory net do not thrive.

**IIAii. High information asymmetries in labor markets (including high search and matching costs, unknown labor quality, and enforcement)**

- o Within a skill category or level, high vacancies coupled with high unemployment of those with that skill / level.
- o Long temporary unemployment spells (normal rates of long-term unemployment).
- o Heavy reliance on personal or family connections in job matches (could also be a sign of social reciprocity in context of high unemployment).
- o Measures to provide labor market information result in significantly higher job applications / hiring.

**IIAiii. Discrimination against groups of workers**

- o Lower probability of employment of certain workers, conditioning on skills and other attributes.
- o Lower remuneration for same level of effort and skill for certain groups.
- o Regulations making hiring or working much more costly or restrictive for certain groups.

**.IIAiv. High costs of spatial moves**

- o Low temporary migration coupled with large spatial wage differences that do not close;
- o Low rates of spatial migration, especially permanent relocation;
- o Unusually high spatial cost of living differences;
- o Unusually high spatial differentials in food security or other security risks;
- o High cost of lost land right, other economic / property right, or social benefits in origin location;

**IIAv. Costly connectivity to labor markets.**

- o High time- and/or financial cost to main employment centers.
- o Low or costly digital / IT connectivity to employment

**IIB. Monopsonistic labor markets**

- o Relatively few dominant employers with no offsetting union or effective bargaining.
- o Unusually large gap between marginal revenue product of labor (proxied by average productivity of labor) and wage in those sectors with a few dominant employers.

**IIC. Non-labor policies favoring capital-using or augmenting technologies (capital subsidies, labor taxes)**

- o Costly labor taxes and/or labor regulation  (high direct/shadow cost of hiring workers).
- o High interest or investment subsidies (distorting technology choice).
- o Output in sectors requiring few workers per unit of output (less labor intensive) expanding faster than those requiring more.
- o Layoffs occurring in more labor-intensive sectors.

## IID.  Mismatch between skills demanded and those supplied (distinct from generally low education and skills)

- Low unemployment for some skills or skill levels, coupled with high unemployment for others.
- High employer investment in worker training for selected skills.
- High employment of foreign workers in selected skills only.
- Unusually high returns to certain skills (see also Box IV. "Low Human Capital") coupled with low returns to others.

### Inadequate education and skills training systems (S).
- o Private returns to education and training exceed social returns (implying that the signaling value of degree/certificate dominates educational decisions rather than market need).
- o Relaxation of the constraint (i.e., provision of additional skilled workers in certain areas) increases employment of workers with those skills one for one (low displacement).
- o Low recruitment by employers from dominant or large segment of training and educational institutions.
- o Strong parallel market for training in lacking skills only.

### High obstacles to accessing jobs-relevant education and training (D)
- o High private cost of accessing jobs-relevant education and training (without financing)
- o Low social value of jobs-relevant education and training.

## III.    Low supply of labor

### Key Signs

- Low labor force participation (by a group or working age population as a whole) coupled with low unemployment and/or under-employment rates (defined as seeking to work (more) at prevailing wages.)
- High and rising market wages for worker categories with low participation in labor market.
- Economic growth and employment respond significantly to increases in labor supply.
- Labor force participation and employment rates increase in response to relaxation of home care constraint / access to productive assets or services for home production or home / childcare, whether over time or with an exogenous spatial shift.
- High in-migration of temporary or permanent migrant workers (especially unskilled).

## IIIA. High returns to / preferences for non-market (subsistence of home- production, home care) or leisure relative to labor market- returns.

Possible signs of IIIAi-IIIAv. (Indicators to be devised based on specific country hypotheses and information).

- High private cost of substituting market-based solutions similar to private returns in labor market (due to high risks or costs of market-based childcare, cleaning, cooking, and other home or family services; accessing food or other basic needs).
- Labor supply unresponsive to changes in market wage.
- Labor supply declines with socio-economic status.

- Group-wise disparities in labor force participation, wages.

## IIIB. Inflated reservation wage due to high public sector wage premium

- Large gap between (higher) public and (lower) private sector wages for similar skills.
- Public sector represents a large proportion of formal employment.
- Applicants to public sector positions who are unsuccessful do not take jobs in private sector (even temporarily) *and* private sector jobs at similar skill levels go unfilled (there is excess supply of labor to the public sector and excess demand in the private sector).

## IIIC. Poor health condition of working age population.

- High rate of withdrawal from the workforce or absence from workplace of ill workers.

## *IV. What Constrains Private Investment and Economic Activity? (Branch of I.)*

- Low private investment/ GDP.
- Small average firm size, high formality.
- Low growth in firm revenues.
- Low entry rates of formal enterprises.

## IVA. Low Private Returns to Economic Activity

- Low expansion of existing firms.
- Low net returns to equity.
- Low productivity and/or productivity growth at the firm level.

### IVAi. Low Private Appropriability of Returns
See V. and VI. below

### IVAii. Low Social or Intrinsic Returns to Economic Activity

#### *IVAiia. Inefficient use of natural capital*

- Evidence of previously / continued excessive rate of extraction of natural resources (current price/social value less than discounted future price/social value).
- Evidence of excessive use of renewable resources for low-return activities coupled with scarcity/low availability of renewable resources for high return activities.

#### *IVAiib. Low natural capital endowment*

- Low availability of fresh water per unit of GDP or per capita.
- Low availability of land or mineral wealth.
- High distance from sea.

#### *IVAiic. Low human capital*

- Low share of workers that are skilled. Eg: What percentage or how many of the full-time permanent workers employed at the end of fiscal year completed secondary school?

- Low test scores on international metrics.
- High and rising share of firms offering training.
- Firms pay a high share of revenues for employee training.
- A high share of workers receive training
- A high share of permit requests for foreign workers.
- High returns to education.
- Increasing returns to education.
- Low unemployment, low under-employment, and high labor force participation of educated workers.
- Decreasing unemployment rates by level of education and training.
- High investment by employers in training of workers.
- High level of educated workers from abroad (possibly with low out-migration of educated workers.)
- Higher growth and investment in periods with more educated workers.
- High costs or barriers to education and training (such as history of apartheid, history of under-investment in education, gender discrimination).
- Net emigration of (most likely skilled) workers, and few work permits for foreigners being requested.
- High share of firms claim that inadequately educated workforce is a major or severe obstacle.

### IVAiid. Poor infrastructure

#### POWER
- High use of privately owned generators.
- High loss of sales due to outages.
- Positive correlation between periods of power availability and GDP.
- Low preponderance and growth of power-intensive sectors.

#### TRANSPORT
- High traffic on low quality roadways.
- High user cost (tariff/fare, other financial and time- costs) and/or low reliability of road freight haulage, airfreight, port service, maritime shipping, air passenger services.
- Low levels of spatial or international trade / low value chain integration with outside world.
- Strong traffic response to improved quality/user cost of service.

#### ICT
- High price of ICT services.
- Low quality / reliability of ICT services.
- High use of multiple providers.
- Low preponderance of ICT-intensive sectors.
- Strong growth or private investment response to expanded/improved service (unconditional on other factors).

- High user cost of service.
- High outages and poor quality of service / water.
- High incidence of water-borne disease, with strong effects on human capital formation (under low human capital).
- High use of expensive work arounds, such as storage tanks, bottled drinking water.
- Aggregate growth or investment response to expanded/improved service (unconditional on other factors).

## IVB. High Barriers to Entry / Low contestability

- High market concentration in commercial sectors.
- High profits or markups in concentrated sectors.
- Low rates of entry of private firms in concentrated sectors.
- High average firm age especially in concentrated sectors.
- Percentage of foreign ownership.
- Concentrated sectors produce inputs to other firms' production.
- Low productivity growth of commercial sectors.
- High regulatory barriers to foreign ownership or other firm entry, whether de jure and/or de facto. Examples may include unduly demanding registration qualifications (such as minimum capital levels, high level (e.g., ministerial) approvals, de facto collusion or retribution for competitors, multiple hurdles to licensing and permitting.
- High rate of firm complaints of unfair competition from other formal firms.

## IVB2: High State ownership of Commercial Sectors

- Is government ownership high in commercial sectors? (What share of each activity is government owned?)
- Are the activities with higher government ownership more concentrated?
- Is productivity growth lower in government-owned sectors?
- Do private firms in high Government ownership activities claim that competition is a major obstacle more often than other firms?

## IVC. High Cost of Finance

### IVCi. Costly Local Finance

- High real interest rates or interest rate suppression/regulation.
- High lending-deposit/savings margins.
- High collateral requirements.
- Low reliance on banks/outside finance for investment and/or working capital requirements, high reliance on own equity.
- Common use of high-interest moneylenders, informal savings vehicles.
- Negative correlation between real lending interest rates and lending or investment rates.[i]

### IVCii. Costly Foreign Finance

- o Poor political risk ratings, bond ratings, and high interest rates on foreign borrowing, coupled with low domestic savings.
- o Low foreign capital inflows.
- o Growth response to foreign capital inflows (unconditional).

## V. High Macro Risks and Distortions (branch of IVA.)

### VA. High, unpredictable inflation

- High levels and variance of inflation.
- High financial outflows, purchases of foreign assets.
- Growth or investment negatively correlated with inflation.

### VB. Dutch Disease

- High currency exchange value and/or cost of non-tradables.
- Low non-resource exports as a percent of GDP.
- Low growth in non-resource sector(s).
- Negative correlation between resource and non-resource-based growth.

### VC. Distortionary exchange rate

- Much higher or lower than equilibrium real effective exchange rate.
- Active black market in foreign exchange.
- High divergence between market and official exchange rate.
- Queuing for foreign exchange at official rate.
- High or growing disequilibrium in external accounts.
- Low exports and export growth.
- Negative correlation between currency value and growth or private investment.
- Systematically low export levels for countries in same currency union or using same currency, all else equal.

## VI. High Micro Risks and Distortions (branch of IVA.)

- Are there a good number of formal firms in each sector (including agriculture)?
- Is the firm-size distribution what one would expect for an economy at this level of GDP per capita?
- What share of employees (include owner-operators, sole traders) are employed by each size category?
- What is the average wage by firm size, sector and ownership? (cross referenced with labor section regulations branch)

### VIA. High/ risk-augmenting taxation of economic activity

- High rates of taxation of economic activity.
- Highly uncertain/arbitrary rates of taxation of economic activity.
- High cost of tax compliance procedures.

- High informality, smuggling, negotiated exemptions, and tax evasion.
- Tax based on weak proxy for profits (such as revenues, size of facility, which augments risks to firms).

## VIB. Inadequate guarantees of property rights via weak:

### VIBi. Control of corruption
- Low scores on control of corruption (Worldwide Governance Indicators (WGI), Government Integrity (Heritage Foundation), Corruption Perceptions Index (Transparency International), other indicators.
- High reported cost of irregular payments (World Bank Enterprise Surveys)
- Improvements in control of corruption positively correlated with growth or private investment.

### VIBii. Rule of law, stability, and security
- Low scores on political stability and security (WGI).
- High level of political violence (Armed Conflict Location and Event Data, ACLED) or homicide and violent crime rates.
- Low scores on Rule of Law (WGI), Judicial Effectiveness (Heritage Foundation), Freedom House)
- Indicators positively correlated over time with growth or private investment.

### VIBiii. Property Rights Protections: (Weak legal protections for shareholders, land-holders intellectual property holders. High Threat of expropriation or uncompetitive actions to protect state owned enterprises.)
- Enterprises: Low scores on protection of property rights, minority shareholder protections.
- Intellectual property: Weak patent protections. Low number of patents issued.
- Land: Low scores on land rights; significant impact of stronger land rights on investments in land; low investment in land (including such investments as tree crops, terracing, immovable irrigation equipment, tall buildings); costly workarounds, such as stationing guards or growing unprofitable crops to protect right; low productivity of land. High percentage of firms state that access to land is a major or severe constraint.
- Threat of expropriation: Recent history of expropriation.
- High percentage of firms remain at micro scale and outside sectors more subject to expropriation.

## VIC. High or highly arbitrary/uncertain regulatory burden of:

### VICi. Product market regulation
- Poor ratings on quality of product market regulation;
- High reported cost of compliance;
- Growth/economic activity and entry disproportionately in less regulated products;
- High price or low quality of products or services in regulated markets;

### VICii. Trade Barriers (own, by others)
- High tariffs and non-tariff barriers;

- o Low ratings on costs of trade (Doing Business) and Trade Freedom (Heritage Foundation);
- o Low exports / GDP;
- o Low trade / GDP;
- o Low trade in sectors with higher barriers;
- o Few exporting firms;
- o Low growth of exporting firms;
- o Few firms utilizing imported inputs;
- o Relatively little employment and sales accounted for by exporting companies.
  - How does this pattern look across sectors compared with other countries and export/GDP averages?

## VICiii. Controls on investment

- o Low scores on Investment Freedom (Heritage Foundation).
- o Low justification (based on environmental, worker protections rationales) for investment hurdles.
- o High discretion by political leaders in investment approvals.
- o Low rates of private investment.

## VICiv. Labor / input market regulation

- o Unusually high level of self-employment (for country's income level) with lower renumeration than wage work;
- o High preponderance of micro enterprises with no or few paid workers;
- o High labor informality relative to firm informality.
- o Growth or private investment increases in periods when regulatory constraint is relaxed.

## *VII. Market Failures in Innovation (branch of VI.)*

## VIIA. High unexploited technology spillovers

### VIIAi. Inability to capture returns to innovation such as through patent protections.
- o Low number of patents registered.
- o Low innovation readiness (e.g., Innovation Ecosystem, World Economic Forum Competitiveness Rankings).

### VIIAii. Barriers to foreign direct investment or expertise.
- o Low foreign direct investment.
- o High and costly domestic partner or other requirements or prohibitions.
- o Domestic ownership share equal to minimum required for high proportion of ventures.

### VIIB. High unexploited learning by doing

*VIIBi. Low incentives or high obstacles to learning and risk taking (e.g., bankruptcy protections)*

- Weak bankruptcy protection laws;
- High costs of insolvency;

- Low tax deferral or linkage between tax liabilities and profitability / low encouragement of risk taking;
- Other barriers to "doing" from elsewhere in branches under IV.

## VIII. Market Failures in Information, Coordination and Agglomeration (branch of VI.)

### VIIIA. Spatial dimensions: Failure to invest at efficient level over space (lagging or booming regions) and achieve spatial agglomeration.

- High disparity in income per capita over space (relative to normal/efficient benchmark)
- Low urbanization relative to population size or density.
- Low urban density given level of urbanization.
- High disparity in infrastructure provision over space relative to latent demand (tests under Section IVAiid. for sub-national areas).

### VIIIB. Coordination failures among producers e.g., to signal quality and meet market access conditions.

- Poor, inadequate quality signaling mechanisms or standards enforcement;
- Low occurrence of cooperative arrangements;
- Low vertical integration;
- Low or ineffective value chain investments;

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[i] Suppose market demand for investment finance in period *t* is given by: $Q_t^D = F(\boldsymbol{D}_t; i_t)$. $\boldsymbol{D}$ is a vector of *exogenous* demand shifters, and *i* is the real interest rate. Assume that: (1) $\frac{\partial F}{\partial \boldsymbol{D}} > 0$ (normalization such that the vector of partial derivatives is positive); and (2) $\frac{\partial F}{\partial i} < 0$ (i.e., demand is negatively related to the real interest rate given the values of *D*). Supply of investment finance is similarly as follows: $Q_t^S = G(\boldsymbol{S}_t; i_t)$. $\boldsymbol{S}$ represents a vector of *exogenous* supply shifters. Suppose that (3) $\frac{\partial G}{\partial \boldsymbol{S}} > 0$ (a normalization); and (4) $\frac{\partial G}{\partial i} > 0$. Supply is upward sloping in the real interest rate given the values of $\boldsymbol{S}$. Market equilibrium in period *t* is represented by a pair of *endogenous* variables [*i\*(S,D),Q\*(S,D)]*

such that $Q_t^d = Q_t^s$. If the demand and supply functions are (upper/lower) hemi-continuous and monotonic, there exists a function for the equilibrium interest rate $\equiv \aleph(S_t, D_t)$, which has the following properties:

(5) $\frac{\partial \aleph}{\partial S} < 0$ $and$ $\frac{\partial \aleph}{\partial D} > 0$. In this test of interest rates and private investment, one is examining the relationship between the two endogenous variables over time, .i.e., $\mathrm{d}i^*/dQ^*$. Note that $\frac{di^*}{dQ^i} = \frac{\partial \aleph}{\partial D} \boldsymbol{dD} + \frac{\partial \aleph}{\partial S} \boldsymbol{dS}$.   If overall this relationship/correlation is less than 0, then this implies that the absolute value of the first vector of terms is lower than the absolute value of the second vector of (negative) terms.  The effect of supply side shocks exceeds the effects of demand side shocks.  Therefore, supply side movements dominate the relationship and supply side shocks have a bigger effect on investment rates than do demand side shocks in the given economy.   Thus, to test this hypothesis, one can test whether $\frac{di^*}{dQ^*} < 0$. This test does not attempt to explain interest rate determination or the level of investment in the economy.

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