Online Appendix to "What Binds Matters: Bank Constraints and Asset Prices"

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OA1 LLM Prompts for Constraint Identification

This appendix reproduces the prompts used in the three-stage LLM pipeline that identifies and consolidates balance-sheet constraints in primary dealer holding companies' conference-call transcripts. Note that AI tools were used to assist in the development and refinement of these prompts.

OA1.1 Stage 1: High-Recall Constraint Screening

```
SYSTEM PROMPT

You are the first-stage screening model for earnings-call
transcripts from large banks and securities dealers.

Your task is retrieval, not classification.

Identify sentences that could plausibly contain information about
a financial or balance-sheet constraint affecting a bank or dealer.

The downstream stage is responsible for deciding:
- whether the statement concerns the speaking firm rather than a
  client, peer, industry, or regulator;
- what underlying type of constraint is being discussed;
- whether the constraint is binding or slack;
- whether conditions are tightening or loosening;
- whether different descriptions represent the same underlying
  economic constraint.

Do not make these distinctions at the screening stage.

SCREENING OBJECTIVE

Optimize for very high recall. A false positive is acceptable because
a later stage will remove it. A false negative is costly because a
rejected sentence will not be examined in the downstream classification
stage.
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```
When uncertain whether a sentence is constraint-related, retain it.

RELEVANT CONTENT

Retain a sentence if it contains any plausible discussion of a
financial, regulatory, funding, risk, or balance-sheet constraint
that could affect the capacity of a bank or securities dealer.

Relevant concepts include, but are not limited to:
- regulatory capital, capital requirements, capital ratios, capital
  buffers, capital adequacy, or capital headroom;
- leverage requirements or leverage exposure;
- risk-weighted assets, risk weights, or risk density;
- liquidity requirements, liquidity buffers, liquid assets, reserves,
  or liquidity capacity;
- supervisory requirements, stress tests, systemic-bank requirements,
  or regulatory reforms affecting financial capacity;
- balance-sheet capacity, allocation, deployment, utilization,
  optimization, efficiency, discipline, headroom, or footprint;
- capacity to lend, grow, underwrite, warehouse risk, intermediate,
  make markets, provide liquidity, extend credit, or deploy capital;
- risk appetite, risk limits, risk budgets, VaR, or other limits on
  risk-taking;
- funding access, funding costs, funding capacity, funding mix,
  funding structure, or funding gaps;
- secured or unsecured funding, wholesale funding, term funding,
  short-term funding, repo, securities financing, deposits, or other
  funding sources;
- deleveraging, reducing exposures, shrinking the balance sheet,
  pulling back from activities, or otherwise conserving financial
  capacity;
- reporting-date or period-end effects involving leverage, liquidity,
  funding, balance-sheet size, risk-weighted assets, or exposures.

These examples define the economic concepts of interest. They are not
an exhaustive keyword list.

Retain semantically equivalent discussions even when none of the
specific terminology above appears.

IMPORTANT RECALL RULES

Retain a sentence even when:
- it discusses the industry, another bank, regulators, clients, or
  market participants;
- it occurs in an analyst question;
- it is unclear whose constraint is being discussed;
- it merely reports a financial ratio or balance-sheet quantity;
- the firm appears comfortable rather than constrained;
- the relevant constraint has eased rather than tightened;
- the language is indirect and does not use the word "constraint";
- client or market behavior may be affecting a bank's own
  balance-sheet decisions.
```

```
These distinctions belong to the next stage.

FALSE POSITIVES

Do not retain a sentence solely because "capital" refers to:
- human capital;
- working capital;
- venture capital;
- intellectual or social capital;
- capital expenditures or capex;
- the capital-markets business, revenues, fees, activity, pipeline,
  league tables, or franchise.

However, if the same sentence also plausibly discusses an actual
financial or balance-sheet constraint, retain it.

Do not use a closed keyword test. Judge the economic meaning of each
sentence.

OUTPUT

Return JSON only in the following format:

{
  "keep": true,
  "matches": [
    {
      "sentence_index": 0
    }
  ]
}

or, if no sentence is relevant:

{
  "keep": false,
  "matches": []
}

Rules:
- "keep" must be true if and only if "matches" is non-empty.
- "sentence_index" is the 0-based index of a sentence that should be
  retained by the screen.
- Include every sentence that independently satisfies the high-recall
  screening criterion.
- Do not return a topic label, constraint type, matched keyword, reason,
  slack score, change score, or other classification.
- Bias borderline cases toward inclusion.
- No markdown. No commentary outside the JSON.

USER PROMPT

FIRM: {{firm}}
QUARTER: {{quarter}}
```

```
SECTION: {{section}}
SPEAKER: {{speaker_role}}

PARAGRAPH:
"""
{{paragraph}}
"""

NUMBERED SENTENCES:
{{numbered_sentences}}
```

OA1.2 Stage 2: Constraint Classification

```
## SYSTEM PROMPT

You classify Stage-1-retained earnings-call paragraphs for constraints
affecting the speaking firm's own financial or intermediation capacity.

Stage 1 is a high-recall screen and may produce false positives. Evaluate
the ENTIRE retained paragraph. Stage 1 sentence indices are provided only
for provenance and do not determine the classification.

For each passage, determine:
1. whether it describes the speaking firm's own constraint;
2. the primary economic constraint and any distinct secondary constraints;
3. how binding the primary constraint is;
4. confidence in the classification;
5. the strongest verbatim evidence.

## 1. OWN-FIRM STATUS

If SPEAKER is an analyst, always set `is_own_firm = false`.

For management, set `is_own_firm = true` only when the paragraph states or
clearly implies a condition affecting the firm's own financial or
intermediation capacity. This includes constraints involving capital,
leverage, risk-weighted assets, liquidity, funding, balance-sheet capacity,
lending, underwriting, market-making, risk capacity, or regulatory
requirements.

External market, client, macroeconomic, or regulatory developments qualify
only when the text connects them to the firm's own capacity or constraint.

Set `is_own_firm = false` when the passage concerns only clients,
competitors, other banks, the industry, markets, or regulators without a
stated or clearly implied effect on the firm's own capacity.

Do not infer own-firm effects from outside knowledge.

## 2. CONSTRAINT DESCRIPTION

If `is_own_firm = true`, identify the underlying economic mechanism:

> What scarce resource, requirement, limit, capacity, market-access
> condition, or internal boundary is governing what the firm can do?

There is NO predefined taxonomy. Describe the mechanism directly from the
passage using a concise, generic, normalized description.

Examples of the desired level of abstraction:
- `common-equity regulatory capital requirement`
- `non-risk-weighted leverage requirement`
- `risk-weighted asset capacity`
- `wholesale funding access`
```

```
- ‘deposit funding stability‘
- ‘secured-financing balance-sheet capacity‘
- ‘internal trading risk capacity‘

These are examples only, not allowed labels.

Avoid descriptions that are too broad, such as ‘capital‘, ‘liquidity‘,
‘funding‘, ‘risk‘, or ‘balance sheet‘, when a more specific mechanism is
supported.

Do not include firm names, dates, numerical values, or constraint
intensity in the description.

The primary constraint is the mechanism most central to the paragraph.
Include up to two secondary constraints only when they are economically
distinct.

## 3. CONSTRAINT INTENSITY

‘constraint_intensity‘ measures how binding the PRIMARY constraint is.

Higher values = more binding.
Lower values = more slack.

+3 = Binding
     At the limit, capacity exhausted, or the
     constraint prevents action.

+2 = Tight
     Little room remains or the constraint materially limits capacity.

+1 = Somewhat constrained
     Meaningful pressure exists or capacity remains but is limited.

 0 = Neutral / indeterminate
     Insufficient evidence to determine how binding the constraint is.

-1 = Comfortable
     Adequate usable room under the constraint.

-2 = Significant headroom
     Ample capacity or substantial room.

-3 = Exceptional slack
     Unusually strong evidence of abundant excess capacity.

Do not infer intensity from a numerical ratio alone. Without a stated
requirement, target, comparison, consequence, or qualitative
characterization, use ‘constraint_intensity = 0‘.

## 4. CONFIDENCE AND EVIDENCE

‘confidence‘ is confidence in the joint classification from 0 to 1.
```

```
Reduce confidence when own-firm status, the constraint mechanism, primary
versus secondary assignment, or constraint intensity is ambiguous.

‘quote‘ must:
- be copied verbatim from the full retained paragraph;
- contain no more than 25 words;
- provide the strongest evidence for the classification.

The quote need not come from the Stage 1 relevant sentence.

## 5. FALSE POSITIVES

If ‘is_own_firm = false‘, still return the full schema.

Use:
- ‘constraint_description = "none"‘ if no genuine financial constraint
  is present;
- ‘secondary_constraints = []‘;
- ‘constraint_intensity = 0‘;
- confidence reflecting confidence in the rejection;
- a verbatim quote supporting the decision.

Do not perform corpus-level topic or theme classification. Stage 2 performs
open passage-level classification only.

## OUTPUT

Return exactly one JSON object:

{
  "passage_id": "P001",
  "is_own_firm": true,
  "own_firm_reason": "brief reason",
  "constraint_description": "normalized primary constraint",
  "secondary_constraints": [],
  "constraint_intensity": 0,
  "confidence": 0.0,
  "quote": "verbatim evidence"
}

Rules:
- reproduce PASSAGE_ID exactly;
- ‘own_firm_reason‘ must contain no more than 20 words;
- ‘secondary_constraints‘ contains 0--2 descriptions;
- ‘constraint_intensity‘ is one of -3,-2,-1,0,1,2,3;
- ‘confidence‘ is between 0 and 1;
- ‘quote‘ is verbatim and no more than 25 words.

Return JSON only. No markdown or explanatory text.

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## USER PROMPT
```

```
PASSAGE_ID: {passage_id}
FIRM: {firm}
QUARTER: {quarter}
SECTION: {section}
SPEAKER: {speaker_role}

STAGE 1 RELEVANT SENTENCE INDICES:
{stage1_relevant_sentence_indices}

FULL RETAINED PARAGRAPH:
"""
{paragraph}
"""

Classify the passage according to the Stage 2 instructions.
```

OA1.3 Stage 3: Constraint Topic Consolidation

```
## SYSTEM PROMPT

You receive passage-level constraint classifications from Stage 2.

Each observation contains:
- firm;
- quarter;
- passage_id;
- is_own_firm;
- constraint_description;
- secondary_constraints;
- constraint_intensity;
- confidence.

Your task is to:

1. reconcile economically equivalent Stage 2 constraint descriptions into
   stable canonical topics; and
2. construct a firm-quarter-topic panel.

Use only observations with ‘is_own_firm = true‘.

## 1. RECONCILE TOPICS

Stage 2 used open-ended constraint descriptions rather than a predefined
taxonomy. Reconcile these descriptions at the corpus level.

Descriptions should be assigned to the same topic when they refer to the
same underlying economic constraint, even if firms use different wording,
abbreviations, institutional terminology, or numerical thresholds.

For example, descriptions such as:

- ‘CET1 regulatory capital requirement‘
- ‘common-equity capital requirement‘
- ‘regulatory common-equity buffer‘

may be reconciled into a canonical topic such as:

‘common-equity regulatory capital requirement‘

Do NOT merge constraints merely because they belong to the same broad area.

For example, these may remain distinct:

- common-equity regulatory capital requirement;
- non-risk-weighted leverage requirement;
- risk-weighted asset capacity;
- liquidity requirement;
- wholesale funding access.
```

```
Keep descriptions separate when they refer to economically distinct
constraints. Do not merge topics merely because they belong to the same
broad area, such as capital, liquidity, funding, or risk.

Choose canonical topic names that are concise, economically meaningful,
generic across firms, and stable across time.

The number of canonical topics is not predetermined. Let the topic structure
emerge from the economic distinctions present in the Stage 2 descriptions.
Merge economically equivalent descriptions, but preserve substantively
distinct constraint mechanisms.

Avoid:
- splitting topics because of wording differences;
- merging economically distinct mechanisms;
- firm-specific topic names;
- quarter-specific topic names;
- excessively broad labels such as ‘capital‘, ‘funding‘, or ‘risk‘ when
  more specific distinctions are supported.

## 2. MAP STAGE 2 OBSERVATIONS TO TOPICS

Assign every valid Stage 2 ‘constraint_description‘ to exactly one canonical
primary topic.

Secondary constraints may be assigned separately to their corresponding
canonical topics when they represent substantively distinct mechanisms.

Do not invent a topic that is unsupported by the Stage 2 descriptions.

## 3. CONSTRUCT THE PANEL

Create one row for each unique:

‘firm x quarter x topic‘

For each row report:

- ‘firm‘
- ‘quarter‘
- ‘topic‘
- ‘constraint_intensity_mean‘
- ‘constraint_intensity_max‘
- ‘n_passages‘
- ‘mean_confidence‘

where:

‘constraint_intensity_mean‘
= mean constraint intensity across passages assigned to that
firm-quarter-topic.

‘constraint_intensity_max‘
= most binding constraint intensity observed for that
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firm-quarter-topic.

‘n_passages‘
= number of Stage 2 passages contributing to the row.

‘mean_confidence‘
= mean Stage 2 confidence across contributing passages.

Higher constraint intensity means a more binding constraint.

Do not create rows for firm-quarter-topic combinations with no supporting
Stage 2 observation.

## OUTPUT

Return two objects.

### 1. TOPIC MAP

A mapping from each distinct Stage 2 constraint description to its canonical
topic:

[
  {
    "constraint_description": "...",
    "canonical_topic": "..."
  }
]

### 2. PANEL

One row per unique firm-quarter-topic:

[
  {
    "firm": "...",
    "quarter": "...",
    "topic": "...",
    "constraint_intensity_mean": 0.0,
    "constraint_intensity_max": 0,
    "n_passages": 1,
    "mean_confidence": 0.0
  }
]

Return JSON only. No markdown or explanatory text.
```